NRL Instruction Book 105

Bias Buoy Electronics

Communications Systems Branch
Communication Sciences Division

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NAVAL RESEARCH LABORATORY
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TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

SECTION 1

GENERAL INFORMATION

1-1 SCOPE

This operator's guide describes the bias buoy electronics and is in effect on receipt.

Extracts from this publication may be made to facilitate the preparation of other Department of Defense publications.

1-2 GENERAL DESCRIPTION

The bias buoy electronics provides low-power HF and UHF communications from a submerged submarine. Radio equipment and antennas, contained in a floatable buoy, are remotely operated by an inboard control unit through a 1500-ft retractable cable. The system includes a four-channel HF transceiver, four-channel UHF transceiver, VLF preamplifier, wideband VLF/MF/HF amplifier, IFF transponder, buoy with antennas, winch/nest assembly, tow cable, and inboard control assembly. Refer to Table 1-1 for specifications.

1-3 DESCRIPTION OF UNITS

The bias buoy electronics group consists of five units. Refer to Fig. 1-1 for reference designations and relative locations of the units.

- RADIO SET CONTROL - The radio set control is a remote control unit for the entire system. Audio and IF stages of the transceivers are also located in this unit.

- CONTROLLER UNIT - The controller unit is mounted inside the submarine. It houses logic and power contacts for electrical control of the winch. Fuses for power lines are located inside along with the sensing circuits (high-speed cutout, extended-cable cutout and cable-tension cutout).

- REELING MACHINE (Common name: WINCH/NEST ASSEMBLY) - The winch/nest assembly is bolted to the deck of the submarine and contains the winch motor with the reel of tow cable for the buoy. The buoy nests on this assembly when not in use. Refer to Fig. 1-2.

• BUOY - The buoy is a floatable Fiberglas container for radio equipment. Three antennas are located in or on the buoy. The MF/HF whip and UHF dipole are mounted so that they will extend out of the water. The VLF balanced toroid antenna is mounted inside a watertight section of the buoy.

• CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL (Common name: TOW CABLE) - The tow cable consists of a 1500-ft, nine-conductor, steel-jacketed cable. Plastic stabilizing streamers (ribbon fairing) are applied to the 300 feet of cable closest to the buoy.

TABLE 1-1

SPECIFICATIONS

SPECIFICATION	HF	UHF
Frequency range	2-30 MHz	225-400 MHz
Number of preset frequencies	4	4
Type of FREQ control	XTAL	XTAL
MODES	AM, SSB	AM
NOM 50-Ω output	15W	5W
Receiver IF	1.6 MHz/455 kHz	30 MHz
Selectivity	8 kHz/4 kHz	50 kHz
Local oscillator control	XTAL	XTAL
Audio output	600	600
Frequency stability	0.002%	—

TABLE 1-2

FUNCTIONS AVAILABLE

HF TRANSMIT* (AM/SSB)

Four preset channels, 2 to 30 MHz, selectable one at a time.

HF RECEIVE (AM/SSB)

Four preset channels, 2 to 30 MHz, selectable one at a time.

UHF TRANSMIT* (AM)

Four preset channels, 225 to 400 MHz, selectable one at a time.

UHF RECEIVE (AM)

Four preset channels, 225 to 400 MHz, selectable one at a time.

TABLE 1-2 (Continued)

IFF TRANSPONDER:
INTERROGATION INDICATION
RESPOND
Modes: 1, 2, 3A
Codes: 1 through 77 (octal)
VLF FUNCTIONS:
ATHWART LOOP
FORE and AFT LOOP

*Transmission is possible on only one band at a time. Simultaneous reception of a selected channel on both HF and UHF is possible in the receive mode.

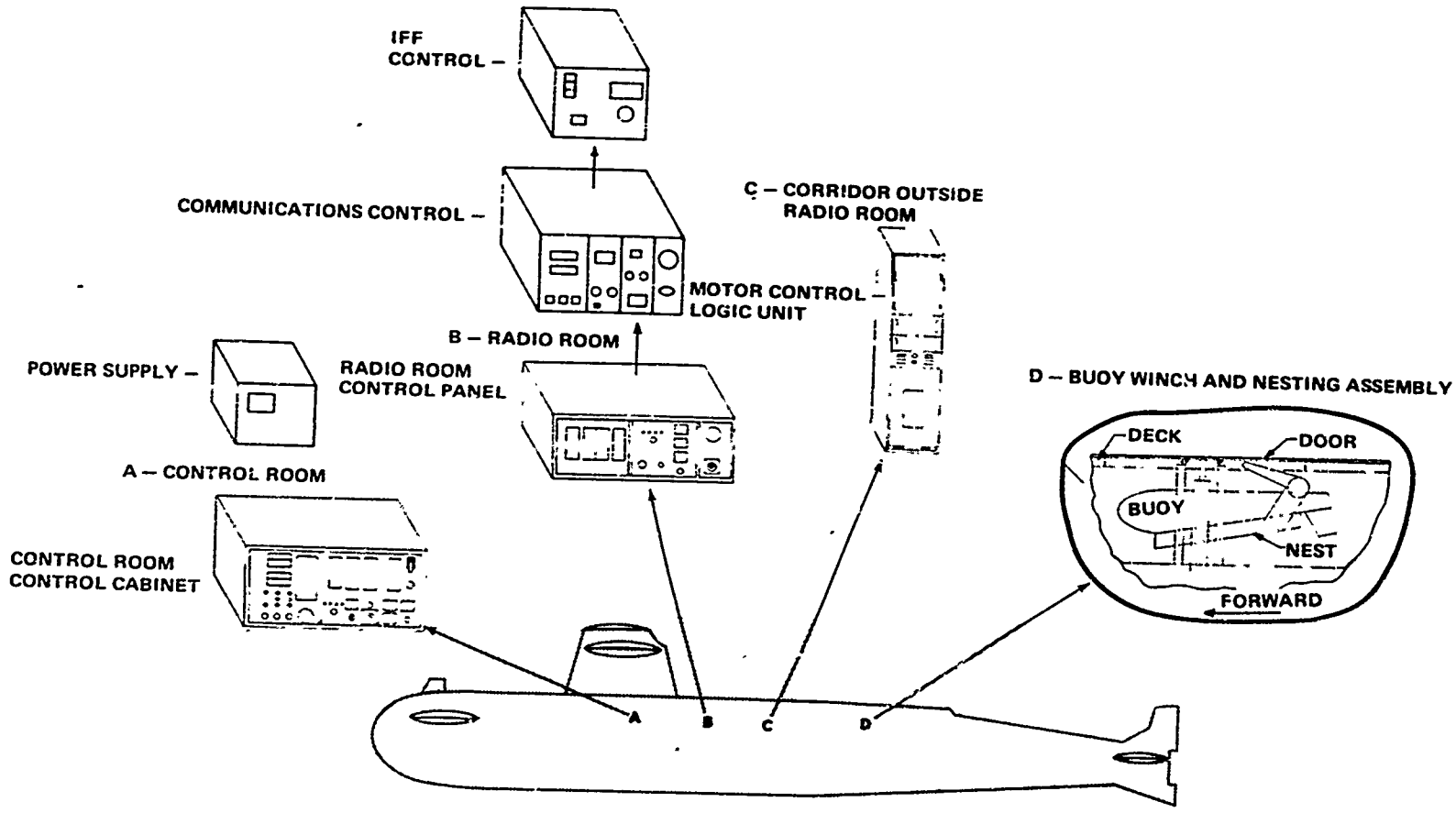

Fig. 1-1. Equipment location

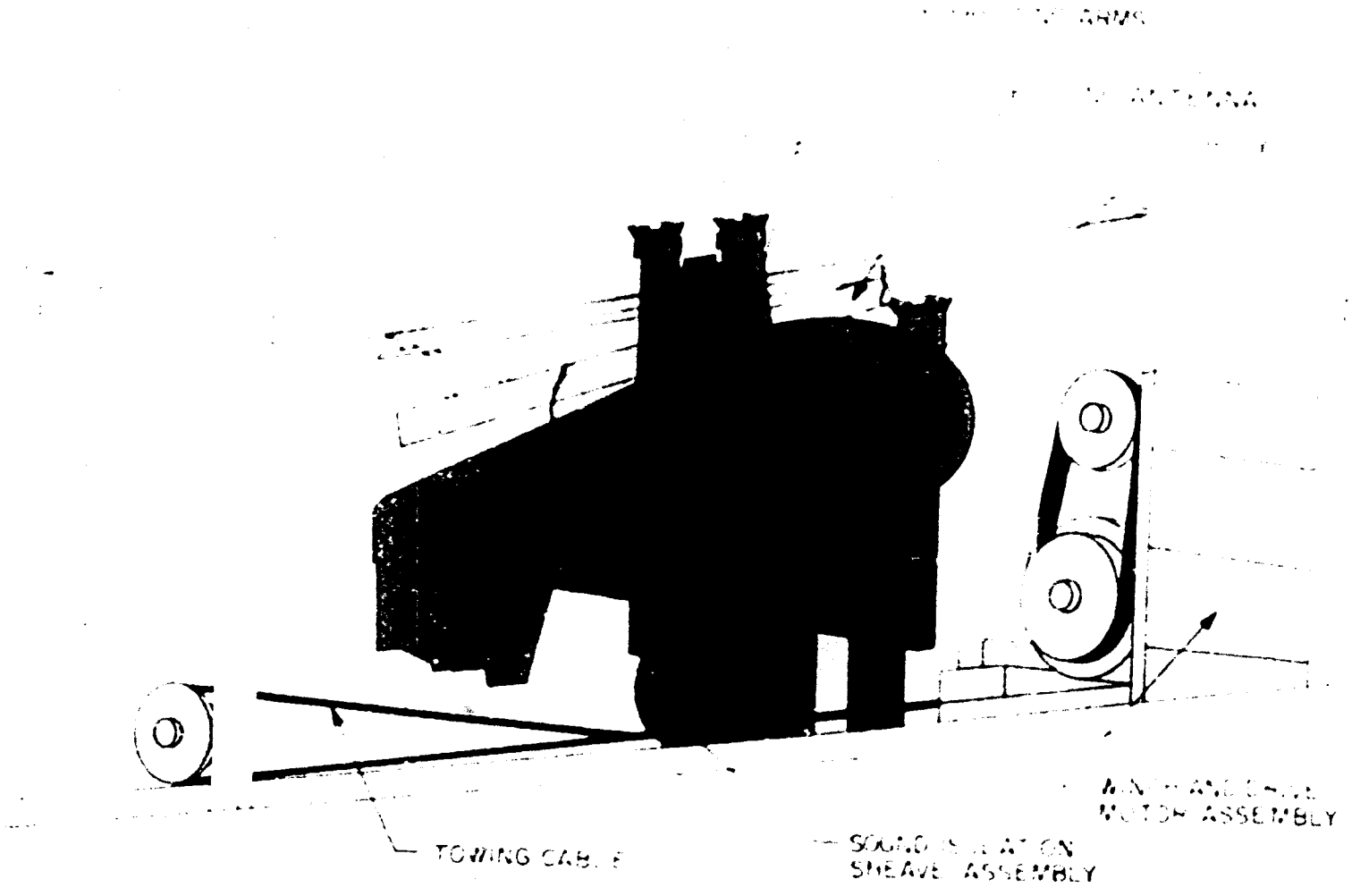

Fig. 1-2. Buoy winch and nest

SECTION 2

OPERATION

2-1 GENERAL

The radio set provides communication on eight preset channels in the HF and UHF range. VLF/LF and MF reception is also provided for communication and navigation purposes. The unit interconnections are shown in Fig. 2-1. The inboard unit is shown in Figs. 2-2, 2-3, and 2-4. Figure 2-5 shows the IFF control unit.

Transmitters and antennas are located in the floatable buoy which is operated by the radio set control. All of the operating controls are located in the radio set control.

2-2 SYSTEM CAPABILITIES

- HF TRANSCEIVER - The HF transceiver has four crystal-controlled channels between 3 and 30 MHz. Either an amplitude modulation (AM) or single side band (SSB) mode of operation is possible. The output power is 15 W, and it is intended for undersea-to-air voice communications.

- UHF TRANSCEIVER - The UHF transceiver has four crystal-controlled AM channels between 225 and 400 MHz. The output power is 5 W, and it is intended for undersea-to-air voice communications.

- BUOY - The buoy contains the RF stages of the HF and UHF transceivers and antennas for VLF, LF, MF, HF, and UHF.

- WINCH/NEST - The winch has 1500 feet of cable which can be reeled out or taken up, as controlled by the radio set control. The nest is a cradle for the buoy when not in use. The cable can be cut if necessary by a switch on the front panel of the radio set control unit.

- RADIO SET CONTROL - The radio set control can remotely control the entire system.

- TOW CABLE - The 1500 feet of cable has nine inner conductors with a shield as the tenth conductor. The cable has plastic streamers to reduce its tendency to vibrate when towing the buoy.

TABLE 2-1

OPERATING CONTROLS AND INDICATORS

CONTROL	POSITION/CONTROL	FUNCTION
Meter switch	Off Mod DC line volts +5V +28V	Meter disconnected Indicates modulation level Voltage to outboard unit Voltage to logic Voltage to signal cards
PS overheat	Lit	Power supply overheating
Power switch	Lit	Activates power supply
Setting	Lit	Indicates logic change
Shutdown outboard power	Lit	Shutdown of outboard power due to overload
VLF switch	Tuned BB Loran C	Tuned VLF mode Broad band VLF mode VLF Loran C mode
Ant tune		Tunes VLF antenna
Ant switch	ATH F/A	Connects athwart loop Connects fore/aft loop
Power switch	Lit	Activates VLF
Set	Lit	Sets VLF conditions
HF channel sw.	1 2 3 4	Selects HF channel 1 Selects HF channel 2 Selects HF channel 3 Selects HF channel 4
AM/SSB switch	AM SSB	Selects AM mode HF Selects SSB mode HF
BFO fine BFO coarse		Adjusts oscillator to demodulate SSB
HF speaker light	Lit	Indicates HF connected to speaker
Volume	—	Adjusts HF phone level
HF transmit sw.	Lit	Selects HF transmitter

TABLE 2-1 (Continued)

CONTROL	POSITION/CONTROL	FUNCTION
UHF channel selector	1 2 3 4	Selects UHF channel 1 Selects UHF channel 2 Selects UHF channel 3 Selects UHF channel 4
UHF transmit sw.	Lit	Selects UHF transmitter
UHF speaker light	Lit	Indicates UHF connected to speaker
Volume	—	Adjusts UHF phone level
Speaker LVL	—	Adjusts speaker level
Speaker switch	Off HF/UHF UHF HF	Speaker disconnected HF and UHF connected to speaker UHF connected to speaker HF connected to speaker
Mod LVL	—	Controls signal fed to transmitter
Dimmer	—	Controls panel lighting
IFF CONTROL BOX		
Power switch	Lit	Activates power to IFF
Interr. light	Lit	IFF being interrogated
Enabled	Lit	IFF able to respond
IFF code	1 to 7 1 to 7	IFF code word 1 IFF code word 2
Mode switch	1, 2, 3A	Selects IFF mode
Set	Lit	Indicates logic change

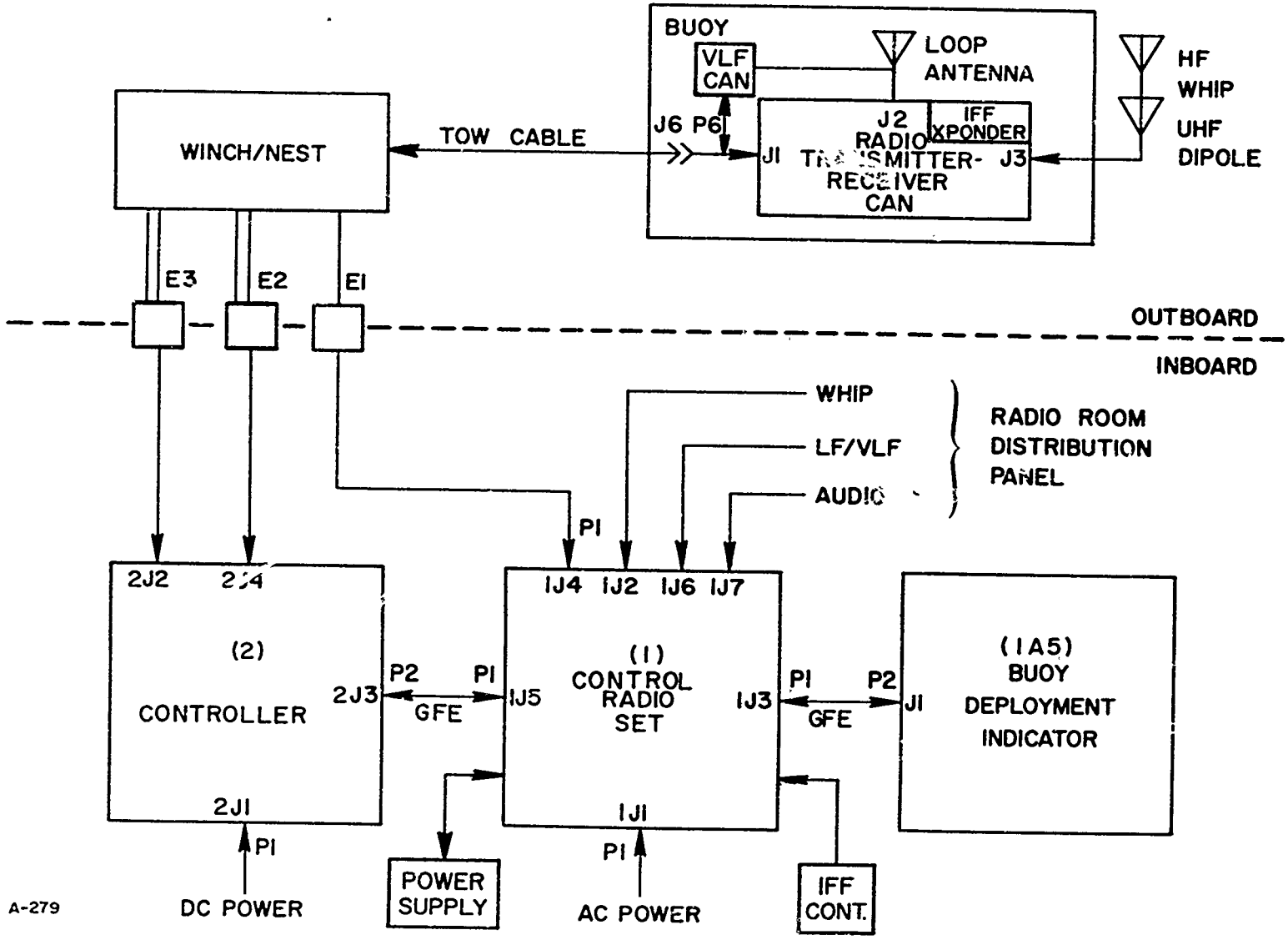

Fig. 2-1. Bias buoy electronics interconnection diagram

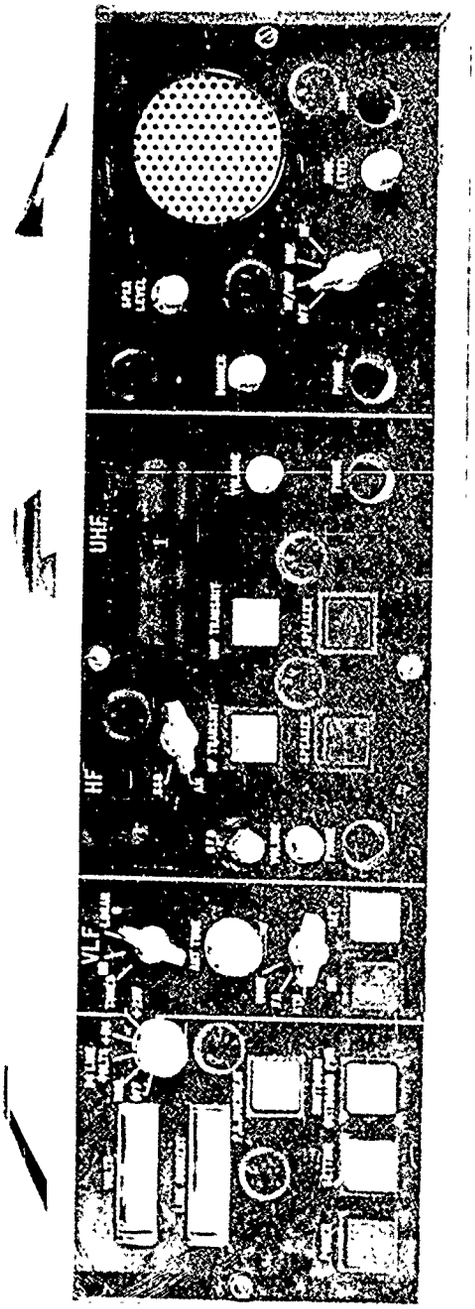

Fig. 2-2. Inboard unit (front)

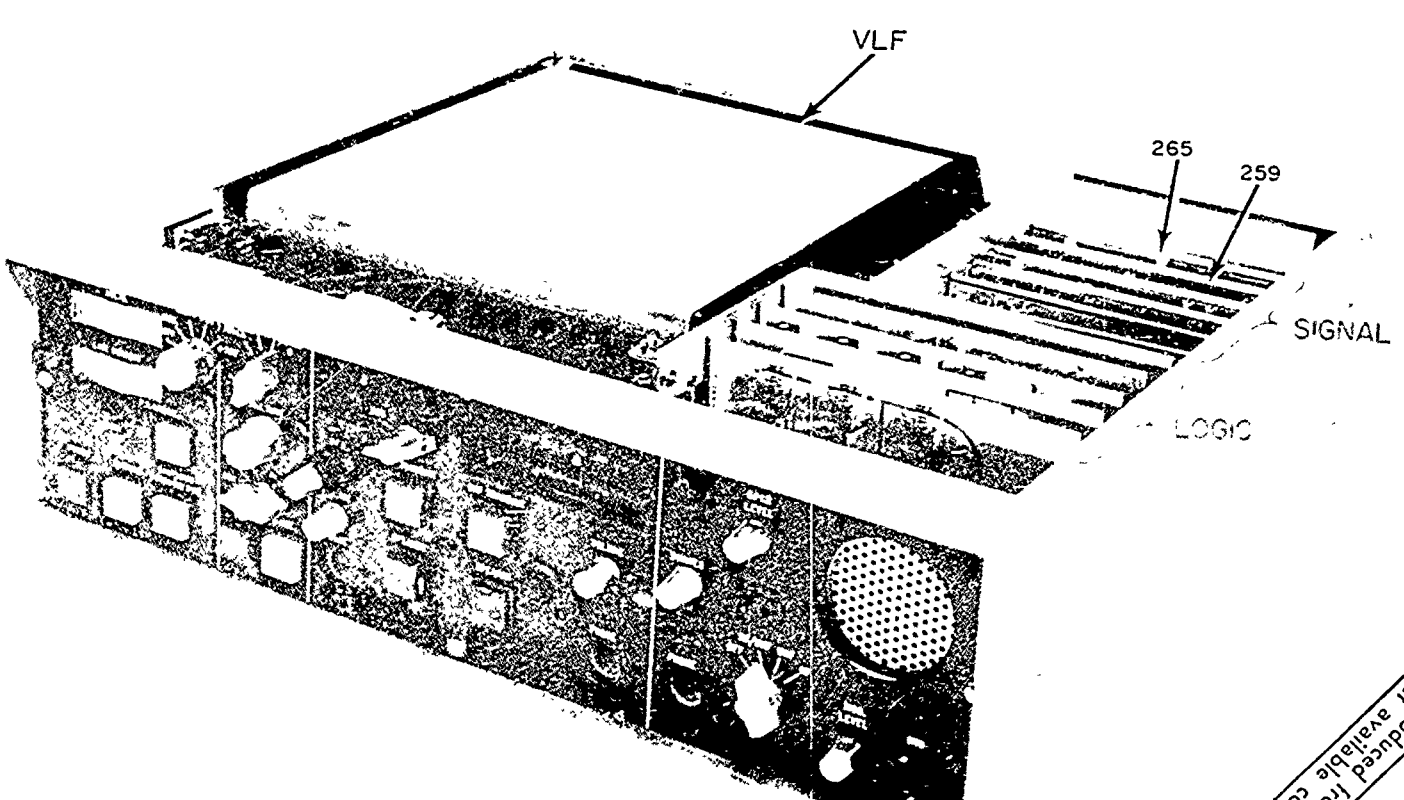

Fig. 2-3. Inboard unit (oblique front)

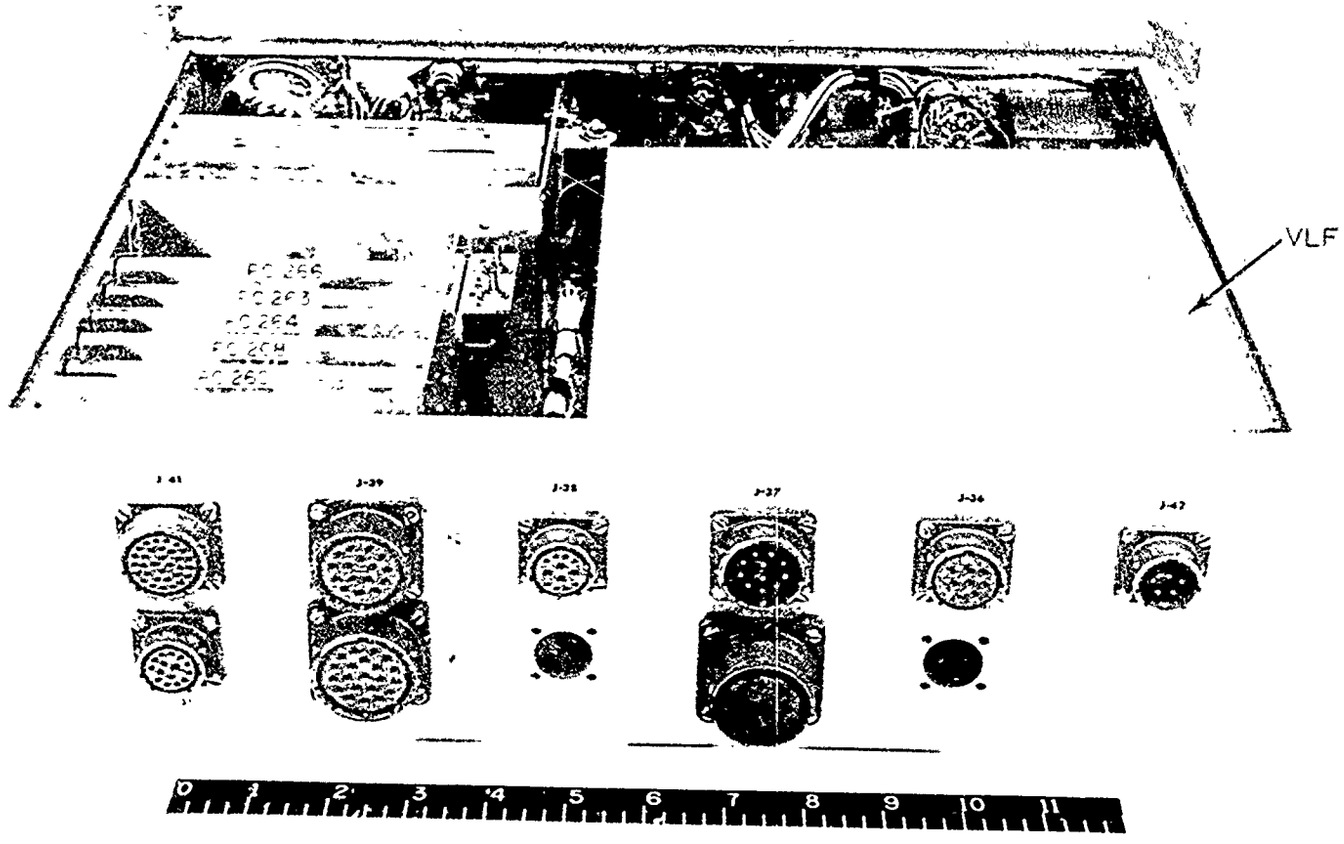

Fig. 2-4. Inboard unit (rear)

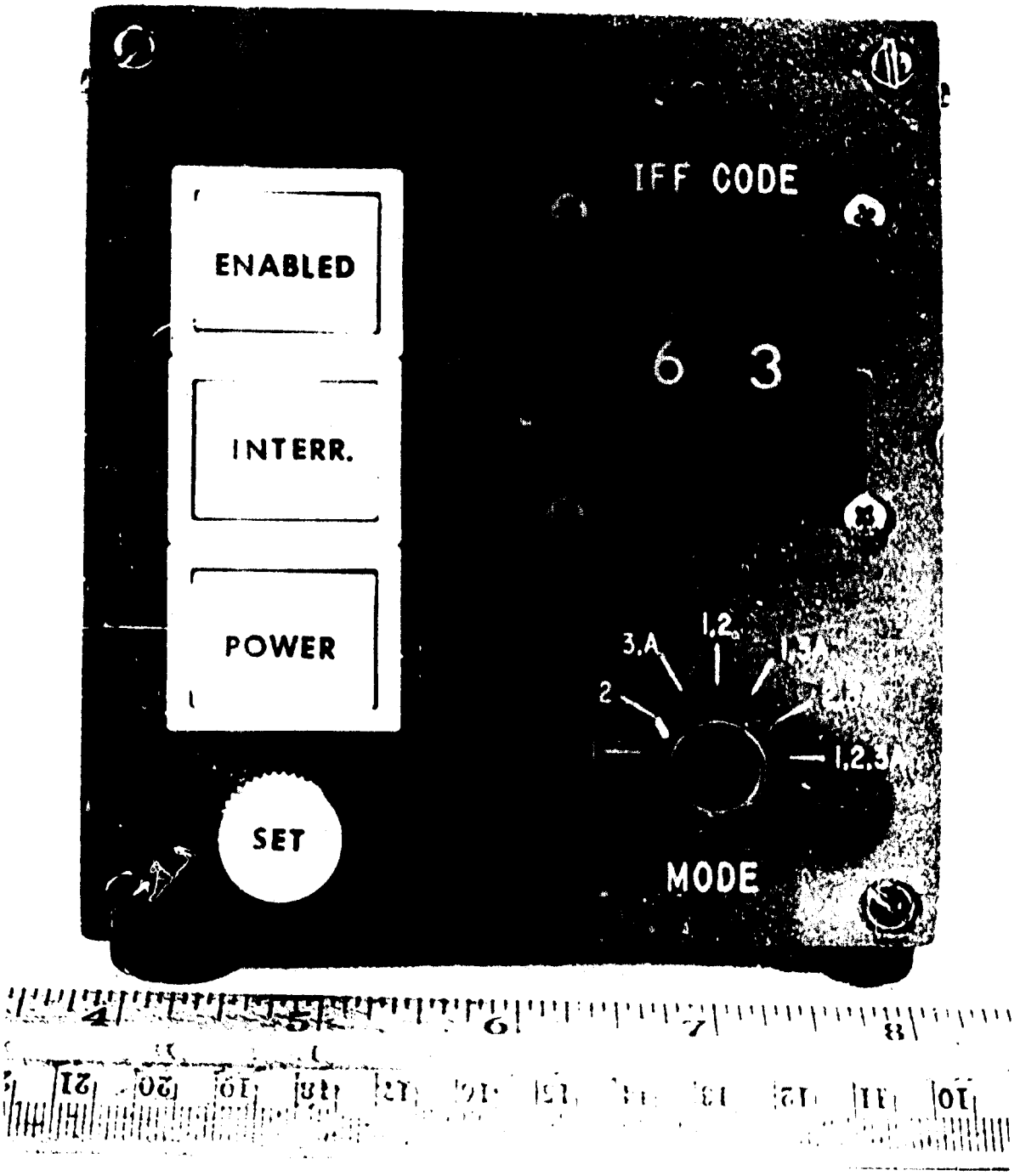

Fig. 2-5. IFF control

SECTION 3

TROUBLESHOOTING

3-1 GENERAL

This section contains functional descriptions of the overall system and the individual circuit boards. Also included as aids in troubleshooting are a description of the control circuits and a checkout procedure for the buoy control and controller.

3-2 OVERALL FUNCTIONAL DESCRIPTION

The bias buoy electronics is functionally broken up into two sections: inboard and outboard. The inboard and outboard sections are connected by the tow cable and auxiliary control connections. Refer to Fig. 3-1 for the overall functional block diagram.

- CONTROL CIRCUITS - To minimize the number of conductors in the tow cable, the inboard and outboard control circuits make up a system of logic switching so that all the control, power, and communications lines are connected.

- VLF CIRCUITS - Two crossed-loop orthogonal antennas located in the buoy feed separate VLF preamplifiers. These outputs feed through the control circuits to two separate VLF amplifiers. Separate outputs (on 1J6) are provided for each channel so that this system will be usable for navigation purposes. (Refer to Fig. 3-2.)

- VLF/MF/HF CIRCUITS - The wideband amplifier is fed by the whip antenna. The amplifier output is connected through the control circuits to an output jack which can be connected to an all-band receiver or to a multicoupler. (Refer to Fig. 3-3.)

- UHF TRANSCEIVER (See Fig. 3-4) - The UHF antenna is a dipole mounted vertically on the whip antenna mast. Except for the audio and control sections, the entire UHF transceiver is located in the buoy. Operating controls and audio input and output are connected through the control circuits to the radio receiver/transmitter.

- HF TRANSCEIVER (See Fig. 3-5) - All the RF circuits of the HF transceiver are located outboard. The operating controls and the transceiver IF are connected through the control circuits to the radio receiver/transmitter. The receiver IF feeds into IF and detector circuits, which in turn drive the audio output stage. In the transmitter section the speech amplifier is connected to either the AM modulator or the

SSB exciter and combined with the 455-kHz carrier. The 455-kHz IF is coupled through the control circuits to the mixer and RF stages and then finally to the HF whip antenna.

- IFF TRANSPONDER - See the Bias Beacon Transponder instruction book.

The IFF transponder is a unit assembly Stewart Warner Electronics model 01A234027. This unit is not field serviceable. For further information see the transponder instruction book. (Refer to Fig. 3-8.)

- DEPTH SENSOR - A pressure transducer located in a floodable section of the buoy is connected through the control circuits to an indicator on the radio set control.

- WINCH/NEST CONTROL - The winch is operated by the radio set control through the controller unit which switches the high-current DC power required to activate the winch. The winch automatically stops if the tension on the tow cable is incorrect (too high or too low) or if a preset amount of cable has been reeled out. For further details consult the winch control instruction book.

3-3 CIRCUIT BOARD FUNCTIONAL DESCRIPTIONS

This paragraph contains information useful in troubleshooting all the circuit boards of the system. Because of the many functions of each board, it would be impractical to list the boards functionally. Boards are listed by their PC number. Figures 3-2 through 3-5 show the functional sequences of each circuit. Refer to Section 6 for a schematic diagram of each board.

- PC-181: FIRST HF CONVERTER

The first HF converter, in the receive mode, changes the operating frequency (2-30 MHz) to 1.6 MHz. In the transmit mode, it converts the 1.6-MHz IF to the desired transmit frequency.

In the transmit mode the 1.6-MHz IF is coupled from pin 17 to cascode amplifier Q5 and Q6, which is enabled in the transmit mode only. A portion of the amplified 1.6-MHz IF is tapped from the tuned circuit L2 - C22 in parallel with the series capacitance of C23 and C24. Then it goes through the π matching network L1, C34, and C35 to the bidirectional mixer A1.

The local oscillator Q1 is crystal controlled (3.6 to 31.6 MHz XTAL range), depending on the desired frequency and which channel is enabled. The local oscillator signal is injected into mixer A1 at the secondary center tap of transformer T2. The output of the mixer is coupled through emitter follower Q2 to pin 8 of the connector and then goes to PC-187, the HF Receiver/Exciter.

In the receive mode the amplified received signal is coupled from pin 8 through the Darlington emitter follower (Q3 and Q4) to the bidirectional mixer A1. The received signal is mixed with the appropriate local oscillator signal to produce the first IF of 1.6 MHz. The IF is coupled through the π network L1, C34, and C35 to the cascode amplifier Q7 and Q8, enabled in the receive mode. A portion of the amplified 1.6-MHz IF is tapped from the tuned circuit L3, C28, and C29 and coupled to pin 17 and then goes to the second HF converter.

- PC-182: SECOND HF CONVERTER

In the receive mode the 1.6-MHz first IF is converted downward to the 455-kHz second IF, and also a DC voltage is produced for the AGC used on the receive exciter board.

The 1.6-MHz first IF is connected from pin 8 through the π matching network L2, C1, and C20 and then to the bidirectional mixer A1. The local oscillator signal at a frequency of 2.055 MHz is injected into the mixer at the secondary center tap of transformer T2. The local oscillator consists of a 2.055-MHz crystal Y1 and transistors Q1 and Q2. The output of mixer A1 is the difference frequency between the 1.6-MHz signal and the local oscillator, or 455 kHz. This signal is coupled through the π matching network comprised of L1, C6, and C8. The combination of L1 and C21 presents a high impedance to the local oscillator frequency. The signal is connected to Q3, a common-emitter amplifier, then proceeds through emitter follower Q4 to connector pin 14. The signal is also connected from the collector of Q3 to the AGC amplifier Q6. The voltage is then detected by the voltage doubler diodes CR5 and CR6. The DC voltage is coupled through emitter follower Q7, filtered by C16 and R27, and coupled through emitter follower Q8 to pin 17 and then goes to the HF receive exciter board. In the receive mode, Q1, Q2, Q3, Q4, Q6, Q7, and Q8 are enabled.

In the transmit mode the 455-kHz signal from pin 14 is coupled through common-emitter amplifier Q5 to mixer A1, where when mixed with the local oscillator 2.055-MHz frequency produces the 1.6-MHz IF. The IF signal is connected through the π matching network comprised of L2, C1, and C20 to pin 8 and then continues to the first converter board PC-181. In transmit mode, only transistors Q1, Q2, and Q5 are enabled.

- UHF POWER AMPLIFIER

The UHF amplifier is a Microwave Power Devices (MPD) broadband (225 - 400 MHz) amplifier model PAM. 225-400-20-5M. This is a unit assembly. Due to the critical nature of the circuitry, this unit is not field serviceable.

- PC-184 and PC-297: UHF DISTRIBUTION BOARDS TYPE #1 and #2

PC-184 and PC-297 are the mother boards for the four-channel UHF receiver with two channels per board.

The primary board is PC-297. The RF input from the transmit/receive relay is connected to pin E12. Coil L1 presents a load of approximately 50 ohms at UHF but approaches a short at HF. The RF is connected to the HF receiver from pin E16.

The RF to the UHF receiver is coupled through capacitor C1 (at HF this appears as a moderate impedance) to the selected channel. When a channel is enabled, for example, 4A2A1A4A1 (channel 1), a positive voltage is applied to the anode of CR1, turning the diode on and allowing the signal to pass to the unit. If 4A2A1A3A1 on PC-184 (channel 3) is enabled, then a DC voltage from the unit is applied from pin E4 of PC-184 to pin E7 of PC-297 to the anode of CR3, turning that diode on and then passing the signal through CR3 to the channel. Only one channel can be enabled at any given time.

A +12 V is obtained from the zenered-downward 30-V supply at pin E4. It is distributed from pin E5 to PC-186, the control circuit board, then depending on the selected channel it returns to PC-297 through pins E8 or E9 or to PC-184 through pins E5 or E6.

The AGC is applied to each UHF channel via pin E14 on PC-297 and pin E9 on PC-184.

The 30-MHz IF output is from pin E3 of PC-297. It is gated through CR5 if either channels 1 or 2 are selected, or through CR6 via pin E1 of PC-297 and pin E1 of PC-184 if either channels 3 or 4 are selected.

- PC-185: UHF MODULATOR

Audio from the inboard equipment is coupled from pin 14 to the source of the AGC, FET Q1, and then to the DC-coupled audio amplifier Q2, Q3, Q4, and Q5. The gain of the amplifier, determined by feedback resistors R11 and R8, is approximately 26 dB. The output of the amplifier is taken from the collector of Q5 to pin 12. A second feedback loop, which includes Q1 of the UHF final amplifier PC-183, is returned via pin 13. This loop includes Q5 and has its gain set by resistors R15 and R13. The voltage appearing at pin 13 (approximately +15 VDC), which varies at the modulating frequency, is essentially the collector supply for the driver and final stages of the UHF power amplifier.

A sample of the modulating signal is fed to pin 2 and then to the AGC amplifier comprised of the differential amplifier Q6 and Q7, integrator R22 and C10, and amplifier Q8. When the modulating voltage swings negative past a set level, Q6 approaches cutoff and tends to turn Q8 off. When the gate-source voltage of Q1 approaches zero, Q1 becomes a low resistance. By the divider action of R1 and the resistance of Q1, the input signal is attenuated.

Transistors Q9, Q10, and Q11 comprise a differential amplifier/inverter combination that may be used in conjunction with Q3 of the UHF power amplifier to control the gain of the input stages of the power amplifier. The RF signals will be fed from pin 5 to the integrator R26 and C11 and amplified by the differential amplifier Q9 and Q10, and fed out on pin 8, or if desired, sense may be maintained and thus fed out on pin 6 to the power amplifier.

- PC-187: HF RECEIVER/EXCITER

In the receive mode the received signal is coupled from pin 15 to common-emitter tuned amplifier Q1. The appropriate tuned circuit (Z1A, Z2A, Z3A, or Z4A) is connected as a collector load for Q1 via diode pairs CR1/CR5, CR2/CR6, CR3/CR7, or CR4/CR8, depending on the desired channel. The signal is then coupled to the wideband differential amplifier comprised of Q7, Q8, Q9, and associated circuitry. Transistors Q7 and Q9 form a cascode amplifier with a tuned collector load. When the signal exceeds a set level, an AGC voltage developed on PC-182 is fed to Q8. Transistor Q8 then controls the collector current of the cascode pair, limiting the output signal. The output signal is directed by the appropriate gates from the selected tuned circuit (Z1B, Z2B, Z3B, or Z4B) to connector pin 2. In the receive mode transistors Q1, Q7, Q8, and Q9 are enabled.

In the transmit mode the signal is coupled from connector pin 2 to the selected tuned circuit (Z1B, Z2B, Z3B, or Z4B) and then to emitter-follower Q4. The output from Q4 is coupled to the wideband cascode amplifier Q2, Q3. The selected tuned circuit (Z1A, Z2A, Z3A, or Z4A) is the collector load. The signal is gated from the tuned circuit to the Darlington pair follower, Q10 and Q11, then to output connector pin 14. Transistors Q2, Q3, Q4, Q10, and Q11 are enabled during the transmit mode.

The broadband whip amplifier is made up of Q5, a broadband, low-noise, common-emitter stage, and Q6, an emitter follower. The gain is approximately 25 dB. The input from the transmit/receive relay is pin 15, and the output is on pin 17.

- PC-188: HF POWER AMPLIFIER

The HF power amplifier is a broadband linear amplifier covering a frequency range from 2 to 30 MHz and producing 15 W into 50 ohms.

The output of the exciter portion of the HF Receiver/Exciter board is hard wired to pin E4 which connects to the wideband cascode differential amplifier comprised of Q1, Q2, and Q3. Transistor Q3 controls the collector current of the cascode pair when an AGC voltage is applied to the base.

A signal is applied to the base of Q4 through matching transformers T1 and T2. The signal is coupled from common-emitter amplifier stage Q4 through matching transformer T3 to phase splitting transformer T4 and thence to the push-pull drivers Q5 and Q6.

The output from the drivers are impedance matched to the push-pull output stages Q7 and Q8 through transformers T5 and T6. Bias for the final stages is obtained across temperature-compensating diodes CR6 and CR8. Degeneration for improved linearity is produced by the parallel-resistor combination in the emitter circuits.

The outputs from the final transistors Q7 and Q8 are combined in step-up transformer T7 and applied to the selected matching network (A1, A2, A3, or A4).

The AGC amplifier is comprised of transistors Q10 and Q11 and associated circuits. AGC sense voltage is obtained across parallel-resistor combination R26, R27, and R40 in the VCC BUSS to the final transistors Q7 and Q8. As DC current increases through R26, R27, and R40, the voltage at the base of Q10 drops, turning Q10 on. A voltage is applied to the base of emitter follower Q11 and then to the base of transistor Q3, controlling the output of the cascode stages Q1 and Q2.

Transistor Q9 in conjunction with the AGC amplifier, diodes CR7 and CR9, and capacitors C32 and C38, form a voltage overload circuit. If for any reason the output voltage swing exceeds a certain level, the DC voltage due to the rectifying action of CR7, C32, CR9, and C38 is applied to the cathode of diode CR10. When this drops below the anode voltage, the base of Q9 drops to cut Q9 off. Then the emitter of Q10 rises, turning Q10 on, and AGC action is obtained.

- PC-189: UHF DISTRIBUTION BOARD #3

The master board for the UHF exciter has provisions for mounting four separate exciter channels. Four connections, pins E2, E3, E6, and E7, connect a switched +30 V to the selected channel. The +12 V for the selected channel is obtained by a

resistor/diode combination in conjunction with a 12-V zener diode CR9; for example, channel 1 has resistor R4 and diode CR4. The RF output from the individual exciter channels is coupled through diode CR5, CR6, CR7, or CR8 to load resistor R5 to pin E5 and then to the UHF power amplifier.

- PC-190: UHF EXCITER CHANNEL

The exciter can produce 5 mW of RF power in the frequency range of 225 to 400 MHz.

Crystal oscillator Q1 oscillates at the fundamental crystal frequency. The signal is tapped from tuned circuit L1 and C4 to frequency tripler Q2. The desired signal is coupled to buffer Q3. The output is tapped from tuned circuit L9 and C13 to pin 2. From the mother board the signal goes to the UHF power amplifier.

- PC-191: IF AMPLIFIER

The IF amplifier is tuned to 30 MHz and has a gain of approximately 100 dB and a bandwidth of approximately 45 kHz. The card also contains a detector, audio amplifier, and receiver AGC source.

Bias and IF signals are coupled from the UHF receiver to pin 5 to the base of Q9. The collector of Q9 is matched to the input of the 30-MHz crystal filter, and the filter output is terminated in its characteristic impedance of 4.7 kΩ. The signal is then coupled through four stages of tuned IF amplification. The first three stages are gain-controlled by the AGC voltage. The fourth stage is allowed to produce the required swing for AGC action.

Diodes CR2 and CR3 form the detector doubler. Transistor Q7 is a high-input-impedance audio emitter follower, and Q8 is a direct-coupled audio amplifier connecting the output to pin 14.

The combination of R27 and C22 forms the AGC integrator. Transistors Q5 and Q6 form a Darlington follower pair to couple AGC voltage to the three IF amplifiers and the selected UHF receiver channel through pin 9.

- PC-259: MICROPHONE/AUDIO AMPLIFIER

In the receive mode the demodulated UHF audio signal from the buoy enters on pin 9 and is coupled to the base of Q1. From the collector of Q1 the signal goes to the base of Q2 and from the emitter of Q2 out on pin 6 to the UHF headphone potentiometers. Both Q1 and Q2 are common-emitter amplifiers. In the transmit mode, audio signals from the microphone enter on pin 2 and pin 11. The audio signals from pin 2 go to the gate of a common-source FET amplifier Q5 and then to a common-emitter amplifier

Q6; then that goes to both Q3 and Q7 (emitter followers); finally the signal goes out on pins 6 and 7 to the UHF and HF headphone potentiometers respectively. The audio signal on pin 11 comes from the arm of the modulation level potentiometer, then goes to the gate of Q8 (same as Q5), and finally to Q9, a common-emitter amplifier. At this point the amplified signal goes to three places: the bases of Q4, Q10, and Q12. Q4 is an amplifier/detector that feeds its output to a voltage tripler circuit and finally to pin 13, which drives the front panel meter and reads percent modulation. Transistor Q12 is an emitter follower that supplies an audio modulating signal to the UHF circuitry in the buoy. It leaves on pin 8. Transistor Q10 is a common-emitter amplifier that is coupled to Q11, an emitter follower, and finally supplies the audio modulating signal to PC-265 from pin 15.

- PC-260: SPEAKER/PHONE AMPLIFIER

PC-260 contains the speaker amplifier, speaker headphone amplifier, and two switching amplifiers. Audio signals from PC-264 and PC-259 enter on pin 7 to the base of Q1. Audio signals from the UHF receiver enter on pin 9 from PC-259 and go to the base of Q9. The speaker switch controls the supplies for these amplifiers so that either HF audio or UHF audio or both may be selected. The outputs of these amplifiers go to the speaker volume potentiometer on pin 3 and returns on the arm to pin 8. The audio signals then go to a Darlington emitter-follower, consisting of Q2 and Q3, and from there to Q10 and Q12. Transistor Q10 is a common-emitter amplifier that is capacitively coupled to Q11, also a common-emitter amplifier, with an output on pin 1 to the speaker headphone jack.

Transistor Q12 is a common-emitter amplifier which is capacitively coupled to another common-emitter amplifier Q4. Transistor Q4 drives a complementary push-pull final stage consisting of Q5, Q6, Q7, and Q8. The amplifier output to the speaker is on pin 12.

- PC-263: SUBCARRIER AMPLIFIER

PC-263 consists of a multistage IF amplifier and an AGC loop. The modulated 455-kHz signal from PC-266 enters on pin 2 and is capacitively coupled to the base of Q5. Transistors Q5 and Q6 form the input cascode amplifier which is coupled to another cascode amplifier consisting of Q7 and Q8. Transistor Q9 provides the final stage of amplification and couples into Q10 (an emitter follower) and out on pin 14. The output is also connected to another stage of amplification, Q4, and then is coupled to CR1 and CR2 which form a peak detector. Q1, Q2, and Q3 provide three stages of DC amplification, and the emitter of Q1 is connected to both the collector of Q5 and the

emitter of Q6. When the signal amplitude at pin 14 reaches a set level, Q1 conducts and tends to turn off Q6, providing a decrease in gain and keeping the signal level at pin 14 constant for further increases in the input signal amplitude.

- PC-264: BFO DEMODULATOR

PC-264 consists of the BFO, the HF/AM demodulator, and the HF/SSB demodulator. The BFO consists of two voltage-controlled crystal oscillators, the first containing Q1, Y1, and CR3, and the second containing Q3, Y2, and CR4. The tuning is accomplished by pulling the two crystals (Y1 and Y2) by means of the voltage-controlled capacitors CR3 and CR4. A biasing network, controlled by the coarse (pins 6, 8, and 9) and fine (pins 7, 10, and 11) potentiometers on the communication panel, varies the voltage across the CR3 and CR4 and therefore the frequency of the oscillator. The output of oscillator Q1 goes to the emitter of Q2, and the output of Q3 goes to the base of Q2. Transistor Q2 performs the function of a mixer/amplifier, with its output frequency being adjustable from approximately 453 kHz to 457 kHz by means of the coarse and fine potentiometers.

In SSB operation the input signal from PC-263 enters on pin 12, is divided down to a low level, and is applied to the base of Q5. The BFO input goes to the emitter of Q5; the demodulated signal goes through Q6, which is an emitter follower; the signal then leaves on pin 15 and goes to PC-260.

In AM operation the received signal goes to Q4 and uses its emitter-base junction as a diode to amplitude-detect the modulated 455-kHz signal; then the signal passes through Q6 and out on pin 15.

- PC-265: SUBCARRIER AND MODULATOR

PC-265 consists of the 455-kHz transmit oscillator and the AM and SSB modulators for the HF transmitter. The oscillator is crystal controlled and consists of Q1 and Y1. The output of the oscillator is coupled to Q2, a high-impedance emitter follower, so that the oscillator is not loaded. In the AM mode, the 455-kHz signal is fed to the base of Q3. The audio modulating signal is fed to the emitter of Q3 from Q6. The resulting signal is taken from a capacitive divider in the 455-kHz tuned circuit in the collector of Q3, fed to the emitter follower Q4, and finally leaves the board on pin 14 to go to PC-266.

In the SSB mode the 455-kHz signal from Q2 and the audio modulating signal from Q7 go to a balanced modulator consisting of T1, T2, CR4, CR5, CR6, and CR7. The resultant modulated signal is fed to a tuned amplifier Q8, goes to an emitter follower Q9, and then goes out on pin 14.

The audio modulating signal comes from PC-259 and enters on pin 5. It is coupled to an amplifier/limiter circuit consisting of Q5 and Q6 that limits the output voltage to minimize over-modulation.

In the SSB mode the output of this amplifier/limiter is fed through an emitter follower Q7 to prevent loading of the amplifier.

- PC-266: SUBCARRIER AMPLIFIER/FILTER

PC-266 provides filtering of the 455-kHz IF signals sent from the buoy and of modulated signals sent to the buoy. In the AM receive mode the modulated signal enters on pin 1, is amplified by Q2, and goes through FL1, a symmetrical mechanical filter centered at 455 kHz. The output of the filter goes to Q5, which amplifies the signal and feeds it to Q6, an emitter follower that provides a low-impedance output to pin 14 that goes to PC-263. In the SSB mode the signals from FL1 go through FL2, a USSB filter at 455-kHz carrier frequency, and then go to Q5. At the same time the gain of Q5 is raised by bypassing its emitter resistor with CR4 to compensate for the insertion loss of the additional filter.

In the transmit mode the 455-kHz signal enters on pin 15 and leaves on pin 1. Components Q4, Q3, Q1, and CR1 provide the same functions as Q2, Q5, Q6, and CR5, as described above.

- PC-268: PHONE REMOTE SPEAKER AMPLIFIERS

PC-268 contains the remote speaker amplifier, the HF and UHF headphone amplifiers, and a switching amplifier. The HF signals from the arm of the HF headphone volume potentiometer enter on pin 1 and are amplified by two common-emitter amplifiers, Q1 and Q2, and leave on pin 5 to go to the HF headphone jack.

The UHF section is identical to the above, except that the input pin is pin 2, the output pin is pin 7, and the amplifiers are Q3 and Q4. Audio signals from the speaker volume control enter on pin 11 and go to the base of Q6 in the transmit mode. The UHF audio from the top of the UHF headphone volume control enters through pin 9 and goes to Q5, a unity-gain amplifier. The output of this amplifier goes to the base of Q6. Transistors Q6 and Q7 form a bootstrapped common-emitter amplifier that is capacitively coupled to another common-emitter amplifier Q8; the amplified audio signal then exits on pin 15 to the remote speaker jack.

- PC-277: UHF RECEIVER CHANNEL

When the receiver channel is enabled, +12 V is supplied to pin E1 from the mother board, and an RF signal is applied to pin E4 and the base of tuned amplifier Q1.

This signal is tapped from the tuned-circuit combination L2, L3, L4, L5, and C7 to the base of Q2, the second RF amplifier. From the second tuned circuit L6, L7, L8, L9, and C12, the signal is tapped to the base of mixer transistor Q3.

The local-oscillator signal is tapped from the collector tank of crystal oscillator Q4 to buffer transistor Q5 and from the buffer tank to the emitter of mixer transistor Q3. The local-oscillator frequency will be 30 MHz below the channel frequency if above 300 MHz and 30 MHz above the channel frequency if below 300 MHz.

The tuned-circuit collector load (L11, C17, and C18) is tuned to the 30-MHz IF difference frequency. A low-impedance output point is obtained through the capacitive divider C17 and C18. The output is coupled through the enabled diode CR1 to the mother board and then goes to the IF amplifier PC-191. The AGC voltage is applied to the emitters of the two RF amplifiers Q1 and Q2.

- PC-290 through PC-294: MATCHING NETWORKS

There are seven different matching network types to cover the frequency range of 2-30 MHz. All types contribute a VSWR of less than 1.5. The pin configuration is identical for all types: pin E4 is the RF input, pin E1 is the RF output, pin E2 is the select gate input, and pin E3 is the ground.

The circuitry of the various matching networks are different to some degree. All contain a DPST relay enabled by the channel-select voltage used to switch the output of the HF power amplifier (PC-188) through the matching network to the antenna. The low-frequency networks (2-7 MHz, types 1 and 2) contain a matching transformer tuned to the frequency of interest. The other five types are of the π-network variety, with values changed for the frequency of interest. For all matching networks, depending on the desired frequency, jumpers must be connected between the terminals as described in Table 3-1.

For matching-network types 1, 2, 3, 6, and 7, it is necessary to adjust the tuning capacitor for maximum output when tuning the transmitter.

- Outboard Control Cards (NRL):

  PC-101: Logic

  PC-103: Power Switching

  PC-104: Logic Timing, Line Amplifiers, 5V Regulator

PC-101

PC-101 contains a 20-bit shift register, a 20-bit latch, and a 20-bit parity checker. This card is used for read-in, storage, and parity check of the data message.

TABLE 3-1

JUMPER GUIDE FOR MATCHING NETWORKS

MATCHING NETWORK	FREQUENCY RANGE (MHz)	JUMPER PINS
TYPE 1	2.00 - 2.20	A to B
	2.20 - 2.40	C to B
	2.40 - 2.60	D to B
	2.60 - 2.90	E to B
	2.90 - 3.15	F to B
	3.15 - 3.45	H to B
	3.45 - 3.80	J to B
	3.80 - 4.15	K to B
TYPE 2	3.80 - 4.15	A to B
	4.15 - 4.50	C to B
	4.50 - 5.00	D to B
	5.00 - 5.50	E to B
	5.50 - 6.00	F to B
	6.00 - 6.50	H to B
	6.50 - 7.20	K to B
TYPE 3	7.00 - 8.50	C to B
	8.50 - 10.00	F to B
	10.00 - 11.75	E to B
	11.75 - 13.75	D to B
TYPE 4	13.0 - 13.9	A-E M-J K-F B-C
	13.9 - 14.5	A-J K-F B-H
	14.5 - 14.8	A-E M-F B-N
	14.8 - 15.1	A-E M-J K-F B-N
TYPE 5	15.1 - 15.2	D-B-A C-E-F H-K L-N
	15.2 - 15.3	D-B-A C-E-F H-J L-M
	15.3 - 15.4	D-B-A C-E-F H-J-K L-M-N
	15.4 - 15.6	D-B C-E H-J-K L-M-N
	15.6 - 16.0	D-A C-F H-J L-M
	16.0 - 16.2	D-B E-A C-F H-J L-M
	16.2 - 17.0	D-B E-A C-F H-K L-N
TYPE 6	17.0 - 17.4	B-E-C K-J-F
	17.4 - 18.5	B-E J-K
	18.5 - 20.0	B-C F-K
	20.0 - 21.0	B-E J-C F-K
TYPE 7	21.0 - 23.0	B-E-C K-J-F
	23.0 - 25.0	B-E J-K
	25.0 - 29.0	B-E J-C F-K
	29.0 - 30.0	B-E J-K

This card also has a power-supply failure circuit. A false parity will send a retrigger pulse back to the inboard unit, causing the message to be sent again.

PC-103

PC-103 contains all the switches necessary to switch power to the proper function as indicated by the control data message. The data message states for each bit select the function and activate the switch circuits. The selections are as follows.

(1) Transmit or receive
(2) HF or UHF transmit
(3) HF channel (1 of 4)
(4) UHF channel (1 of 4)
(5) IFF power: ON/OFF
(6) IFF enable

All switched voltages are +30 VDC, except the UHF receive channel which is +12V. The unit can receive on both one UHF and one HF channel simultaneously as selected by the data message.

PC-104

This card contains the sync recognition circuitry. It also contains the line amplifiers. The filters are used for signal separation (transmit), and the combiners are used for signal combination (receive). The 5-V supply regulator is also on this card. The line voltage sensor for control of the line voltage regulator on the inboard power supply is also on this card.

Peripheral Circuitry

The peripheral circuitry includes the zener diodes for overvoltage protection, the high-power switching transistors which need heat sinking, and the battery for the destruct logic circuitry.

- INBOARD CONTROL CIRCUIT BOARDS

  NRL Board 1: Storage and Message Formatter, Parity, and Clock
  NRL Board 2: Timing, Sync
  NRL Board 3: RC Trigger
  NRL Board 4: Interface

Board 1. Board 1 consists of a 20-bit, parallel-load shift register. The state of each register bit is controlled by an appropriate function switch on the control panel or IFF control box. This board also contains a system clock, a sequence counter, and a formatter (clock gate control).

Whenever a function switch is activated, the information in the register is changed to the new state. The switch action also grounds one of the RC circuits on the RC card (card 3), generating a reset pulse. This pulse resets the sequence counter. This also puts the counter in a state which activates an AND gate, which permits clock pulses to step the shift register. The clock pulses also activate the sync generator (on board 2). When the counter has reached a full count, the system shuts down and waits for a new set pulse to be generated by a data change.

Board 2. Board 2 contains the sync generator, the data interleaver, function driver circuits, and lamp drivers.

The clock pulses passed by the clock gate trigger the sync generator to form the sync pulses. After each sync pulse, a data pulse is transmitted until the whole 20-bit message has been transmitted. If the message is received at the outboard end and the parity checks, the system is shut down until there is a data change.

The function driver circuits are used to provide the proper drive to the cards for the selected functions. The lamp drivers are used to provide power to the lamps to indicate the function selected (XMT, RCV, Set, etc.).

Board 3. The RC board contains the RC circuits associated with each data bit which are used to trigger a data message each time there is a data change.

A detailed description of the data transmission function is given in NRL Memorandum Report 1967 by K. A. Chayt.

Board 4. The interface board contains filters, amplifiers, and switches to interface the different lines of the outboard system to the inboard system. The filters and isolation amplifiers are used to separate (RCV) and combine (XMT) the several communications signals. These signals are the 455-kHz HF signal, the audio for the UHF transceiver, and the 700-kHz IFF interrogate indicator signal. The logic amplifier is used to isolate the logic signals.

The switches are used to provide the power to the proper inboard cards to perform the function selected (XMT, RCV, etc.).

- INBOARD POWER SUPPLY

The inboard power supply provides all power for the inboard communications control chassis and for the outboard communications can. The power supply provides the necessary outboard power for the different load conditions possible in the outboard can. This is done using a switching regulator. The power supply has provisions for shut down of outboard power in case of excessive current demand, such as a short.

Power-supply overheating is also indicated. This could be used for automatic shutdown if deemed necessary. An indicator rather than automatic shutdown was used to permit operation under emergency conditions even under overload. A detailed description of the power supply is given in NRL Report 7280. The supply also provides the necessary voltages for the inboard communication and logic circuitry. Refer to Figs. 3-9 and 3-10.

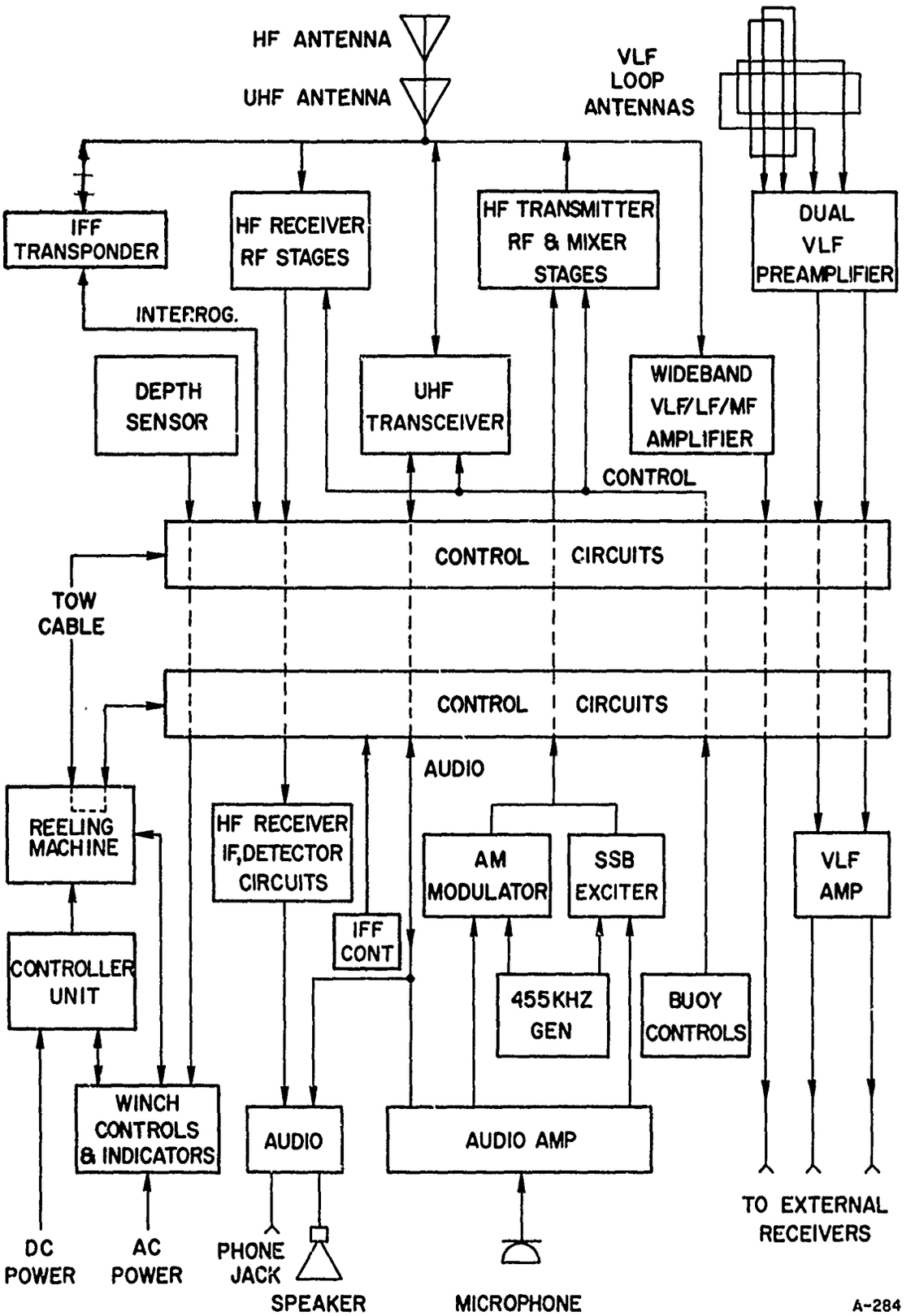

Fig. 3-1. Bias buoy electronics functional diagram

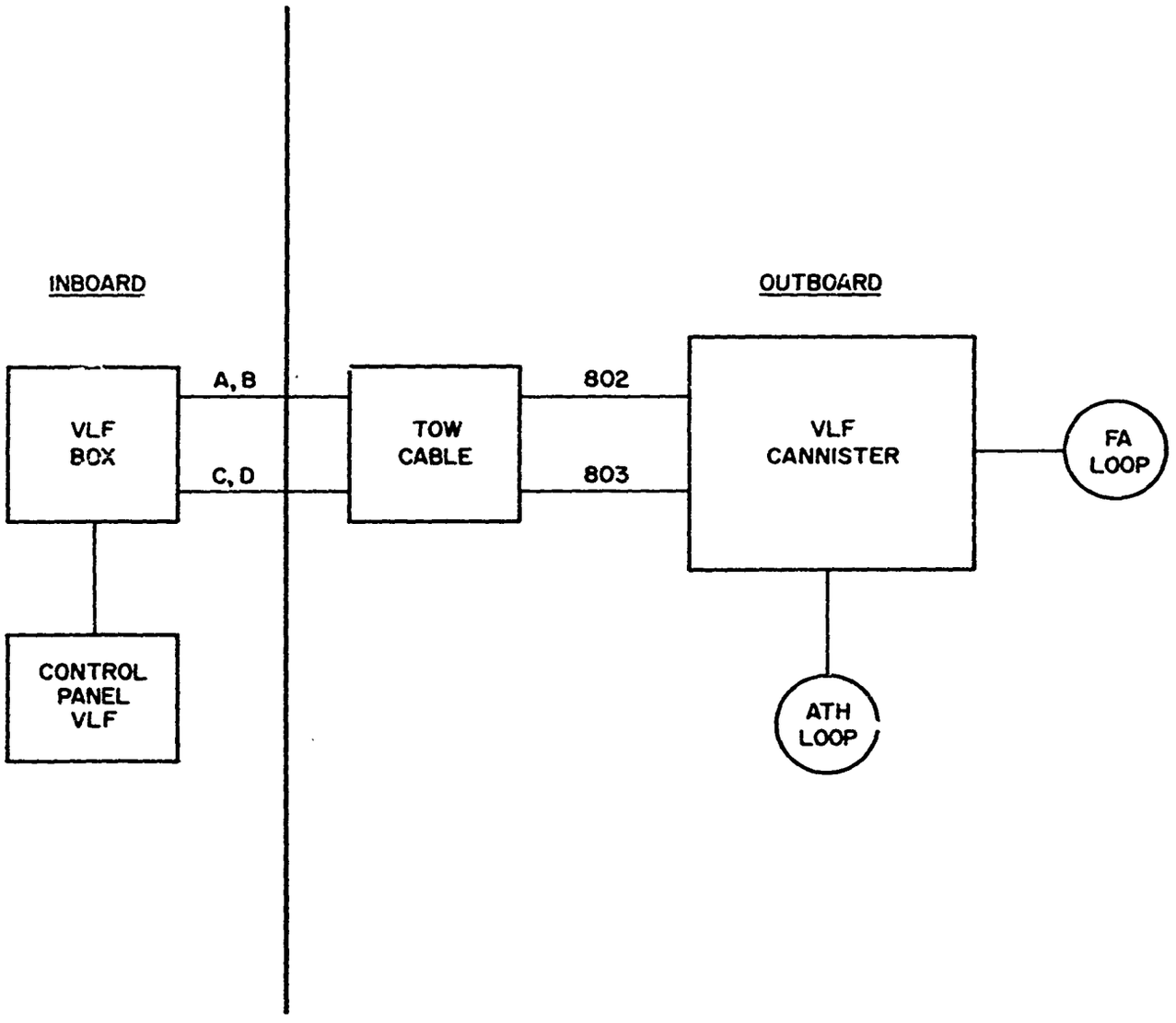

Fig. 3-2. VLF signal flow path

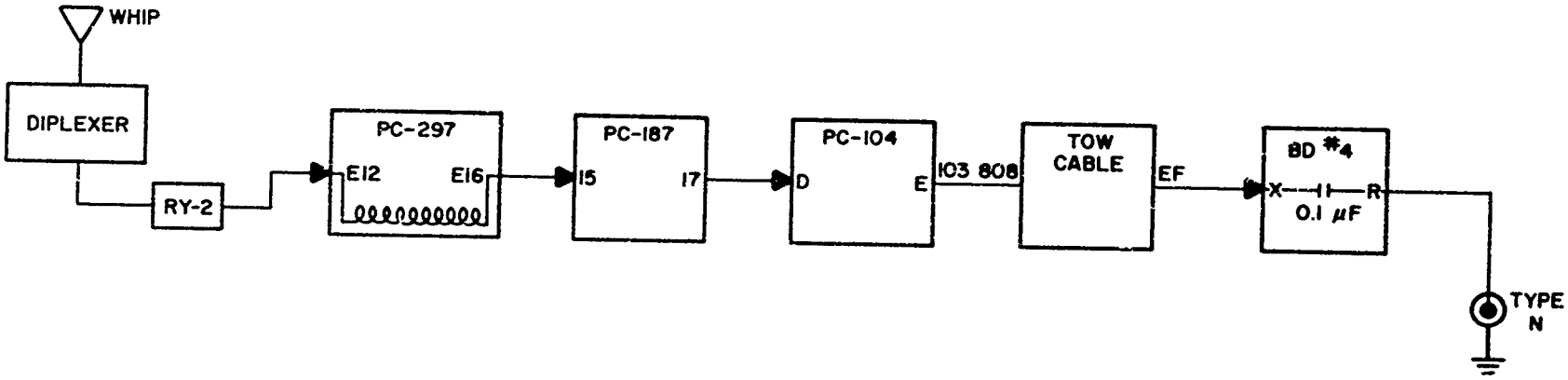

Fig. 3-3. Whip VLF/MF/HF signal flow path

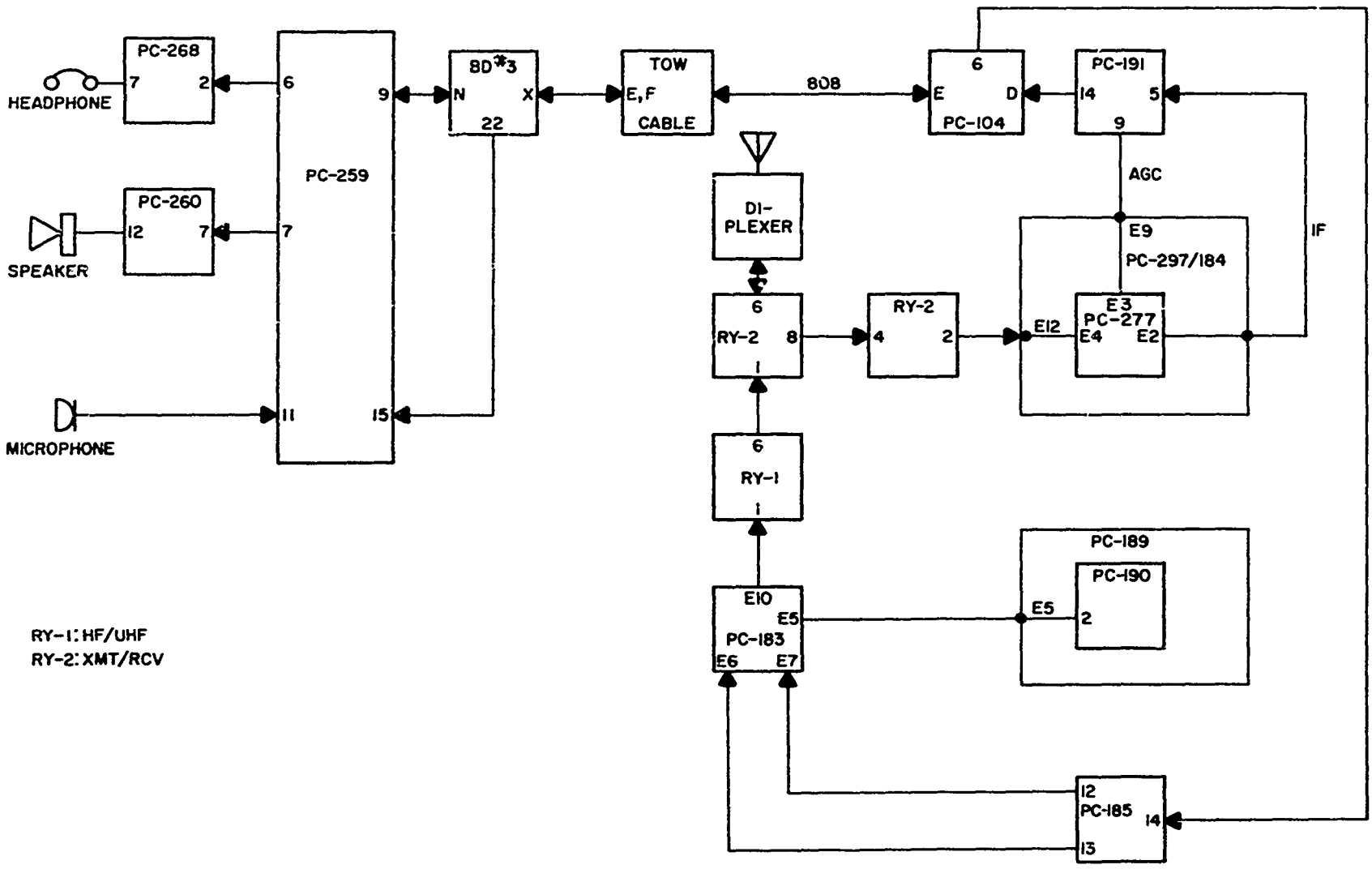

Fig. 3-4. UHF signal flow path

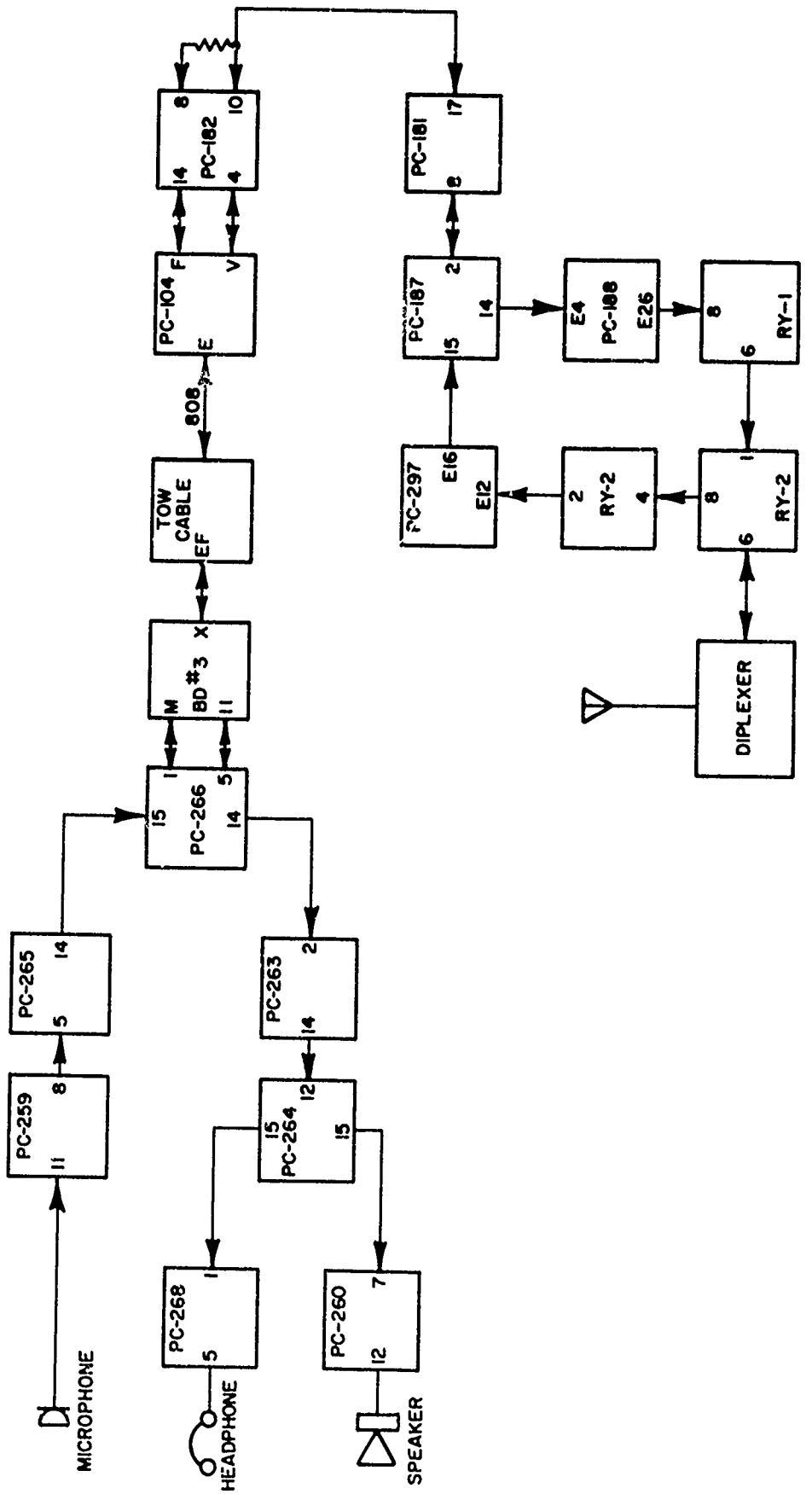

Fig. 3-5. HF signal flow path

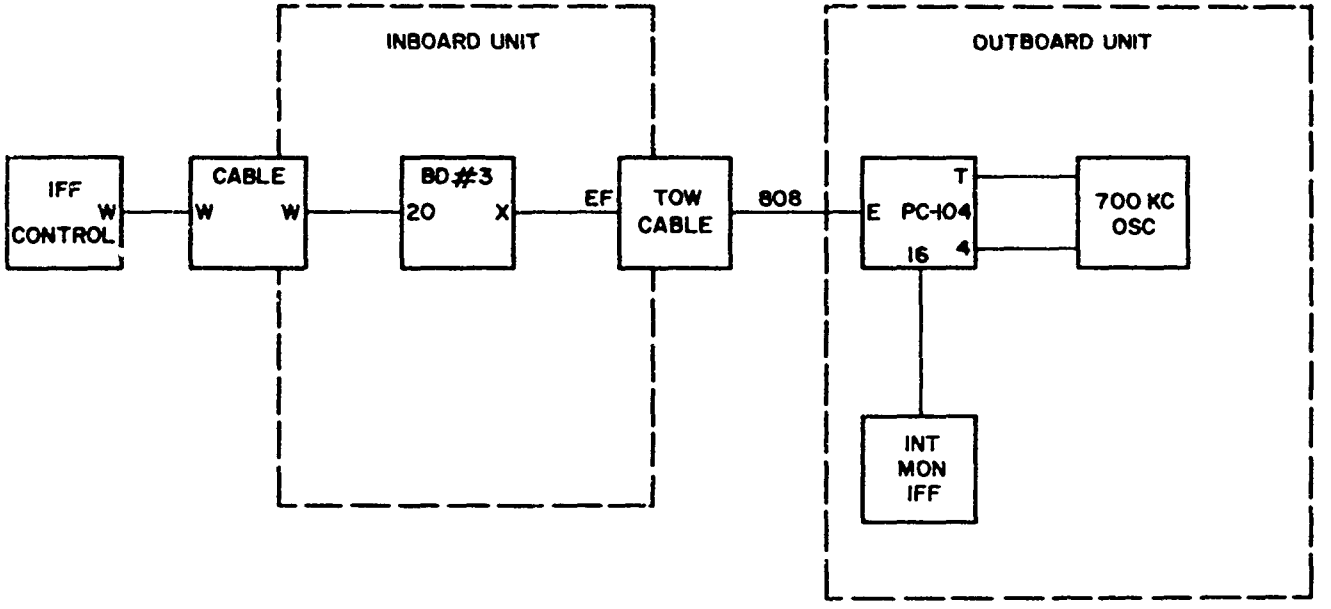

Fig. 3-6. IFF interrogate indicator signal flow path

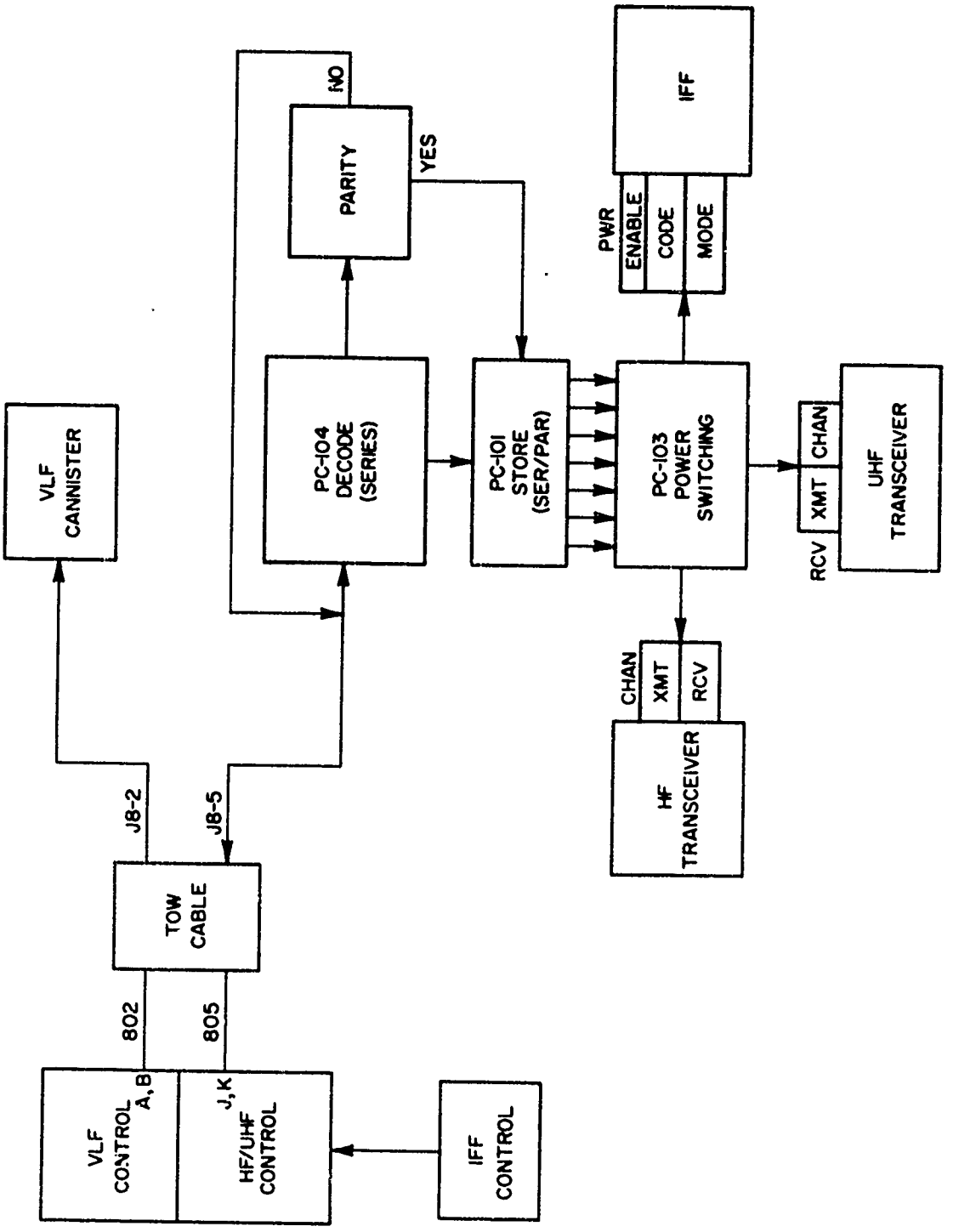

Fig. 3-7. Logic control signal flow path

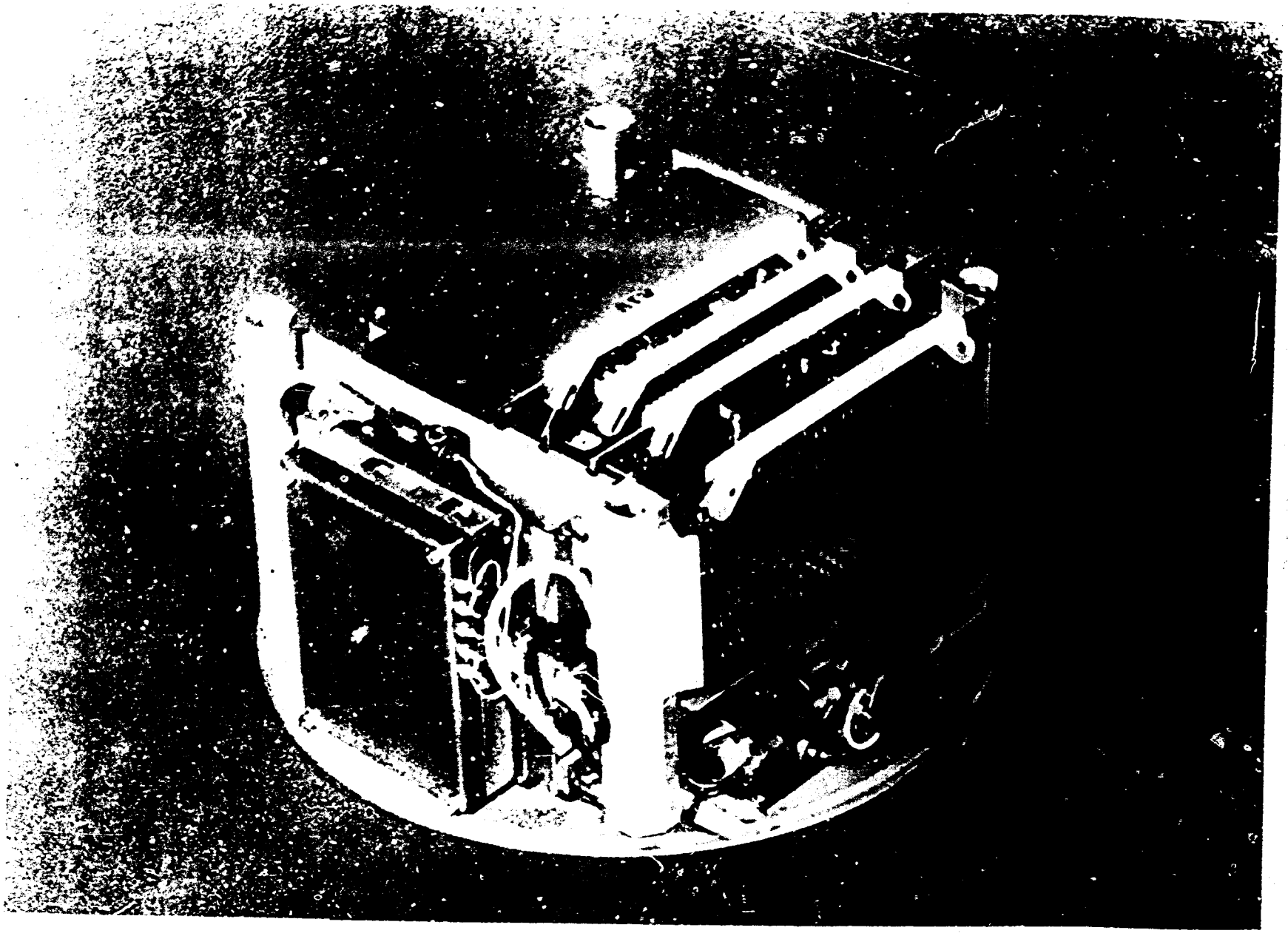

Fig. 3-8. IFF transponder

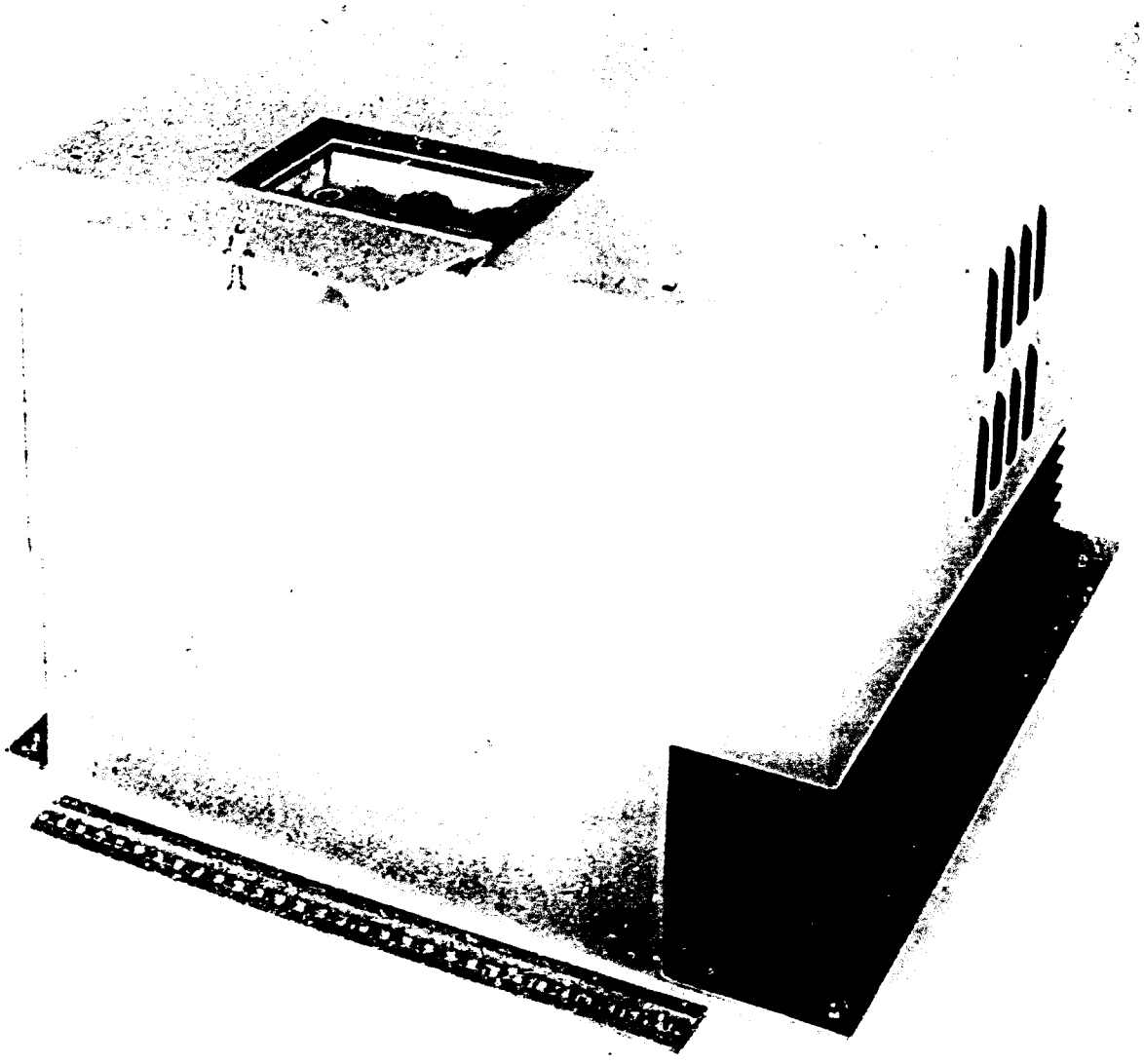

Fig. 3-9. Power supply

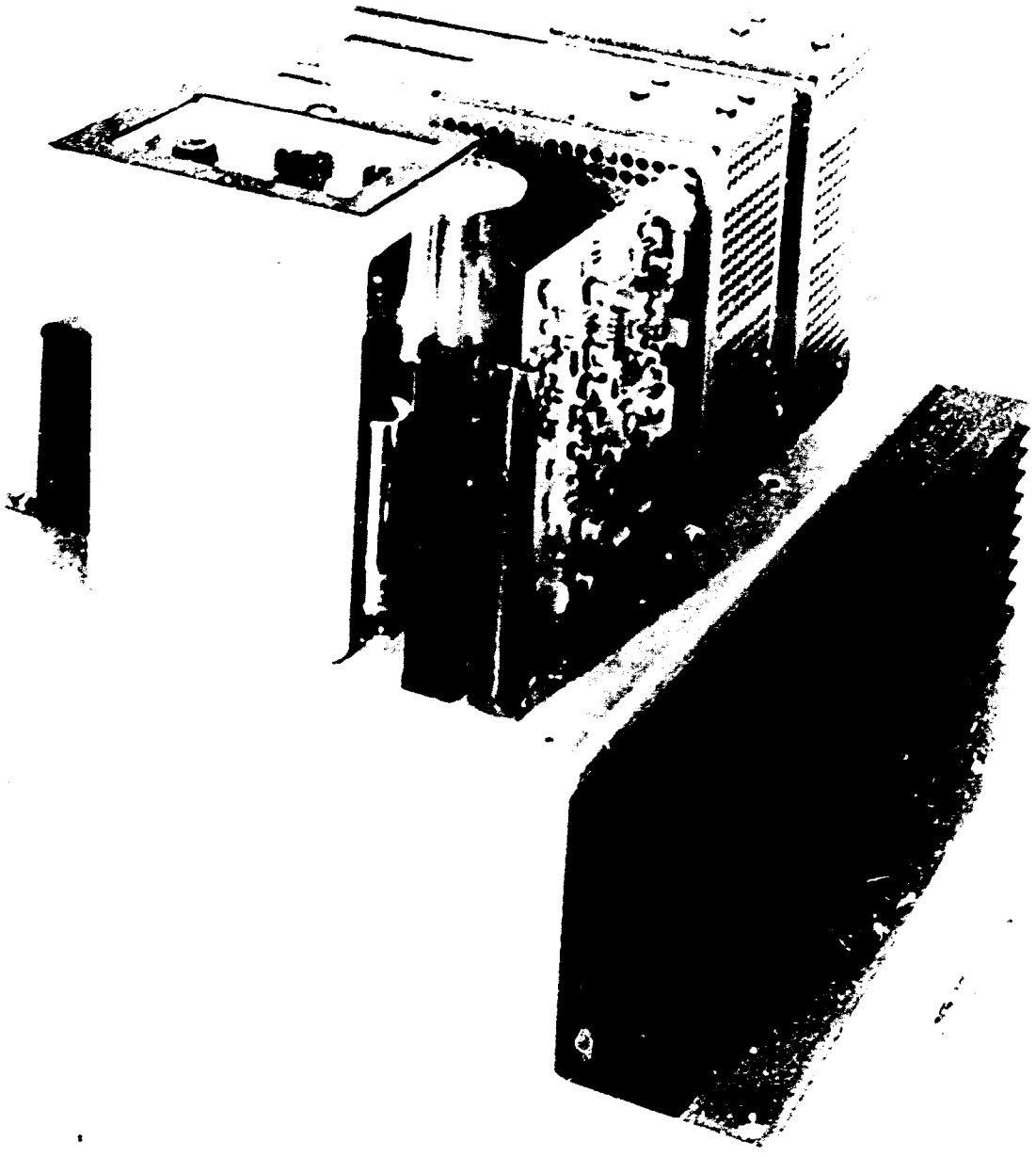

Fig. 3-10. Power supply

SECTION 4

MAINTENANCE

4-1 GENERAL

The bias buoy electronics are made up of a complex network of multipurpose circuit boards connected through a ten-wire cable to a control center. Figures 4-1 through 4-3 show the outboard cannister and electronics.

4-2 CHANGING CHANNEL FREQUENCY

If it is necessary to change the frequency of a channel, the following procedure should be followed. It is necessary to remove the radio receiver/transmitter from the buoy to gain access to the crystals.

a. HF TRANSCEIVER (Fig. 4-2) - Crystals Y1, Y2, Y3, and Y4 on PC-181 are the first heterodyne crystals for HF channels 1 through 4 respectively. Crystal frequency F_x is calculated by the formula

$$F_x = F_o + 1.600,$$

where F_o is the desired operating frequency in MHz.

Once the crystal has been changed, it will be necessary to peak the following XTAL OSC ADJ controls on PC-181:

CHAN 1 - C3
CHAN 2 - C4
CHAN 3 - C5
CHAN 4 - C6

Tune the RF TUNED CIRCUITS and MATCHING NETWORKS (Fig. 4-2). It may be necessary to replace the MATCHING NETWORK if the change in frequency is great enough.

b. UHF TRANSMITTER - Four PC-190 circuit boards make up the four exciters for the UHF transmitter (Fig. 4-3). Crystal Y1 on PC-190 is the fundamental frequency crystal. The desired operating frequency F_o is three times the crystal frequency F_x, as shown by

$$F_x = \frac{1}{3}(F_o).$$

Once the crystal has been changed, it will be necessary to peak the following controls on PC-190 for optimum performance:

XTAL OSC ADJUST
X3 Multiplier
AMPLIFIERS

c. UHF RECEIVER - Crystal Y1 of PC-277 (Fig. 4-3) is the first heterodyne crystal for the UHF receiver, and its frequency determines the operating frequency of the UHF channel. Each PC-277 forms the front end of a channel.

If the desired operating frequency F_o is between 225 and 300 MHz then the crystal frequency F_x of Y1 on PC-277 can be calculated using

$$F_x = \frac{1}{3}(F_o + 30.000 \text{ MHz}).$$

If F_o is between 300 and 400 MHz, then F_x can be calculated by using

$$F_x = \frac{1}{3}(F_o - 30.000 \text{ MHz}).$$

Once the crystal has been changed, it will be necessary to peak the following controls on PC-277:

C23 - XTAL OSC ADJUST
C27 - BUFFER
C7 - RF
C12 - RF

4-3 TUNE-UP PROCEDURES

Included in this subsection are instructions for tuning up the different sections of the systems.

- VLF AND VLF/LF/HF CIRCUITS

  These sections are pretuned, broadband circuits and require no adjustments.

- HF TRANSCEIVER

1. Connect a signal generator to the whip antenna through a 30 pf capacitor. Adjust to the desired frequency and set the attenuator to a minimum.

2. Plug the proper crystal (F_o + 1.6 MHz) into the desired channel (paragraph 4-2a).

3. Set the HF channel select on the communications chassis to the proper channel.

4. Connect an oscilloscope to resistor R24 of PC-182 (91Ω) or to pin 14 of PC-182.

5. Assume that channel 1 is selected. Adjust Z1A (PC-187) for maximum output, reduce the signal generator output as the peak is reached. Adjust the tuned circuit Z1B for a maximum, reducing the signal generator output as required.

6. On PC-181, the first converter, adjust capacitor C29 for maximum output.

7. Connect the frequency counter to the oscilloscope vertical output. On PC-181, adjust capacitor C3, channel 1 crystal-frequency fine adjust, until the counter indicates 455 kHz ± 90 Hz.

8. Readjust capacitor C29 (PC-181) for a maximum.

9. In the transmit mode it is necessary to short out the proper pins on the required matching network. See Table 3-1.

10. Matching networks 1, 2, 6, and 7 can be fine-adjusted by tuning to a maximum, as noted on an RF ammeter.

- UHF TRANSMITTER

1. A spectrum analyzer such as the HP-8554L is desirable in tuning the UHF transmitter. The tuning capacitors of the UHF exciter (PC-190) should be set at approximately the right position. For low frequencies, 225 MHz, etc., the capacitors should be nearly all in. Conversely for the higher frequencies, 400 MHz, etc., the capacitors should be nearly all out.

2. Connect a spectrum analyzer through appropriate attenuators to the antenna cable.

3. Adjust the oscillator tuning capacitor C4 for a maximum at approximately the correct frequency, as viewed on the analyzer.

4. Adjust tripler capacitor C8 and C10 and buffer capacitor C13 for maximum.

5. Connect a frequency counter to the output through appropriate attenuators and load. (The counter must cover the frequency range 225-400 MHz.) Adjust the oscillator tuning capacitor C4 of PC-190 for specified frequency.

6. Reconnect the spectrum analyzer to the output and tune C8, C10, and C13 for a maximum.

- UHF RECEIVER

1. Connect a signal generator (HP Model 608D or equivalent 225-400 MHz) to the antenna input. Set it to the desired frequency and maximum output amplitude.

2. Place the required XTAL (paragraph 4-2c) in the proper channel on the UHF receiver board PC-277.

3. Modulate the signal with 1000 Hz, and listen for a tone from speaker.

4. Adjust the oscillator trimmer capacitor C23 for a maximum. Reduce the signal generator input.

5. Adjust the RF tuning capacitors C7 and C12 for a maximum.

6. Peak the IF tuning coil L1 for a maximum.

7. The IF peaking can be done simply by adjusting tuning coils L3, L4, L5, and L6 of PC-191 for a maximum.

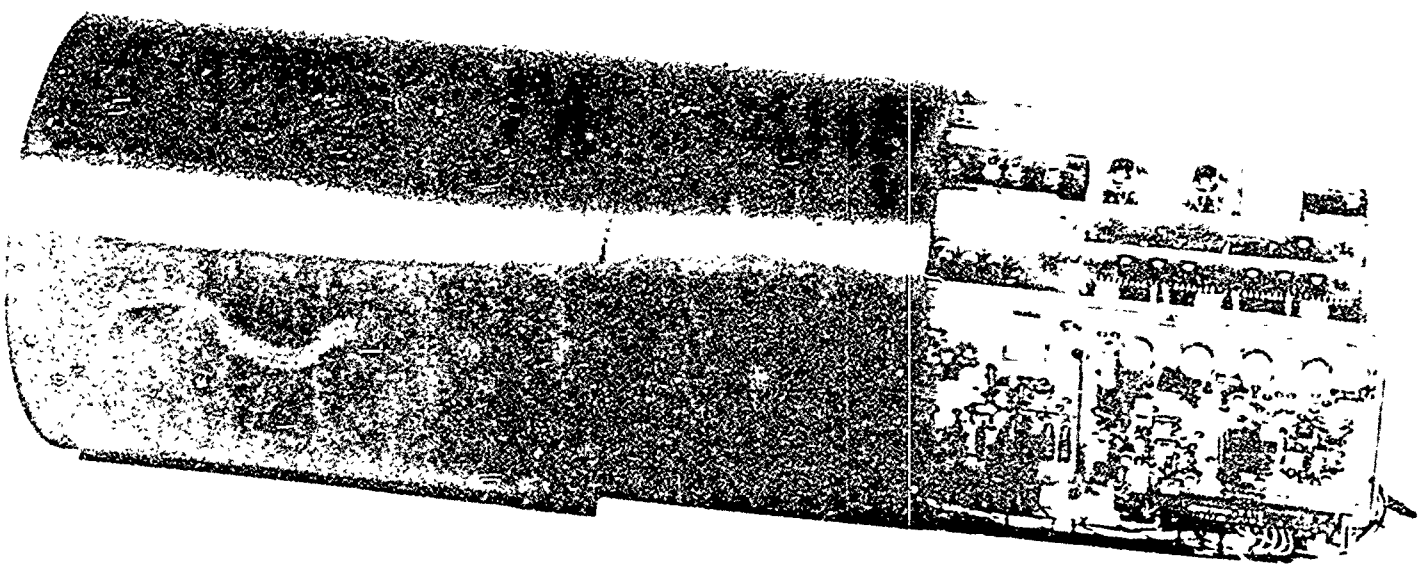

Fig. 4-1. Outboard canister

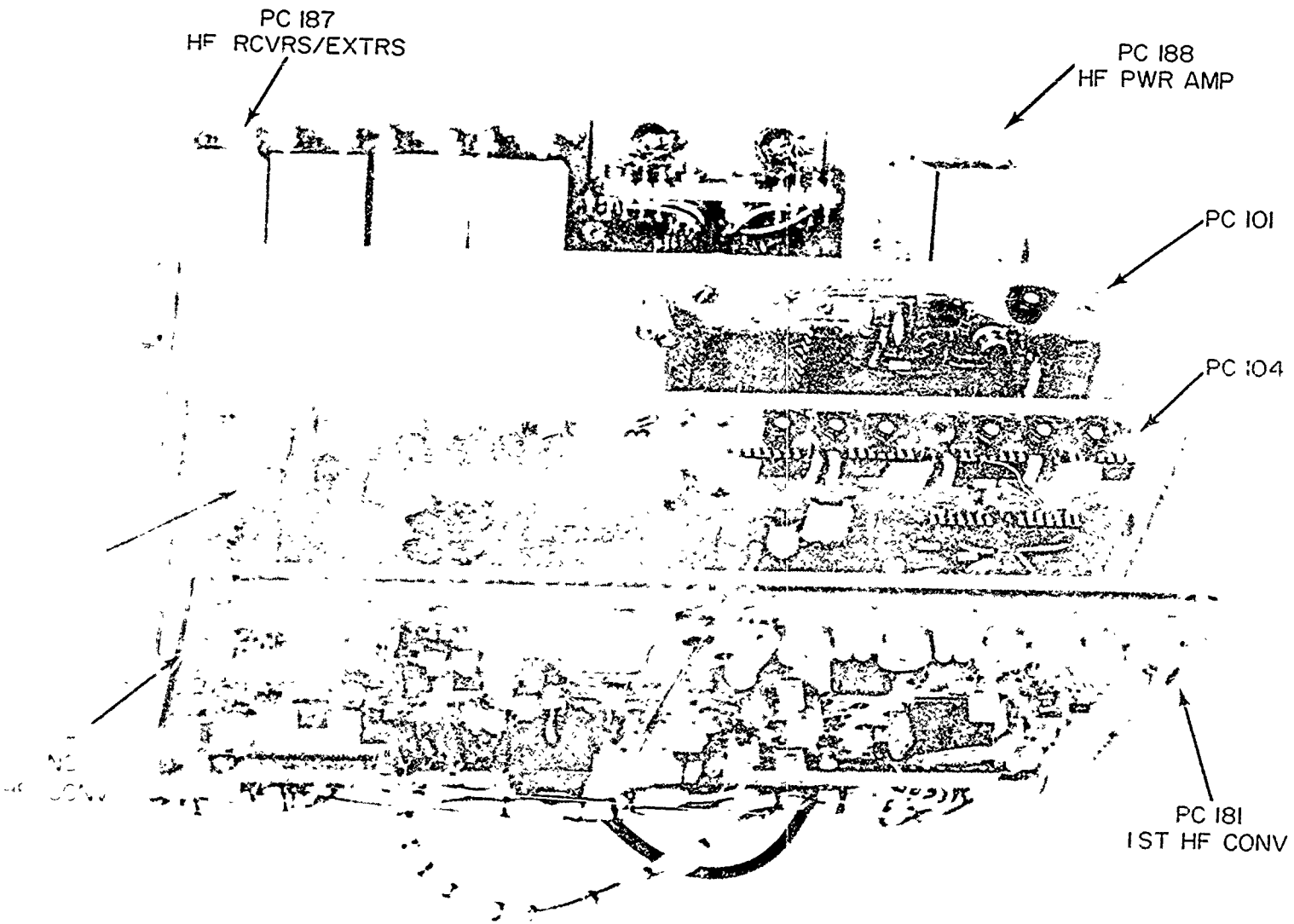

Fig. 4-2. Buoy electronics: HF and logic side

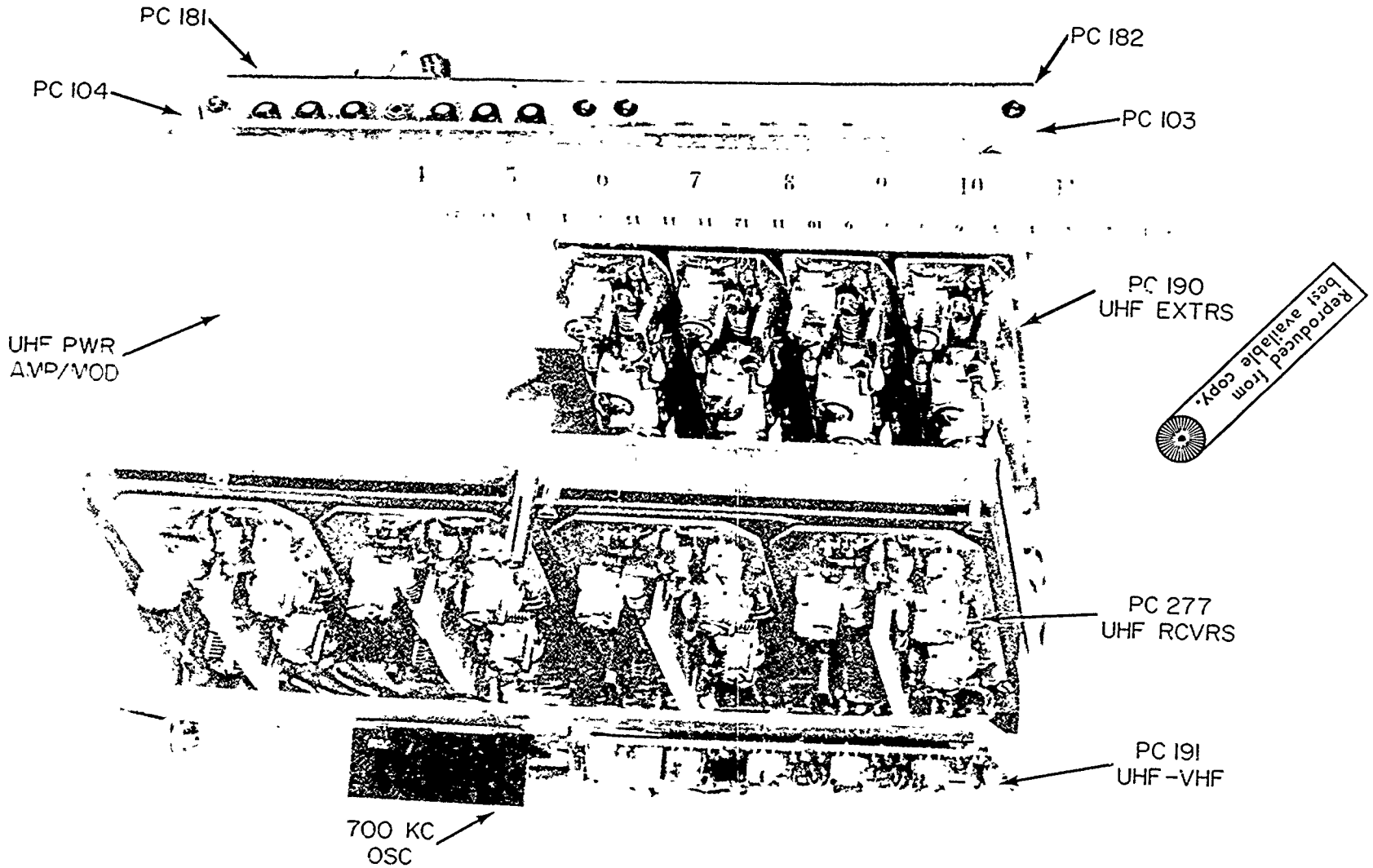

Fig. 4-3. Buoy electronics: UHF side

SECTION 5

PARTS LIST

Tables 5-1 through 5-26 make up the parts list. Each unit, assembly, or sub-assembly is broken down on a separate list to facilitate item location. Each part is listed alphanumerically by reference designation.

TABLE 5-1

MICROPHONE/AUDIO AMPLIFIER (PC-259)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1	CAPACITOR		CSR13E156M
C2, C3, C4	CAPACITOR		CSR13E225M
C5	NOT USED		
C6, C7, C8	SAME AS C2		
C9	NOT USED		
C10, C11, C12	CAPACITOR		CK06CW104M
C13, C14	CAPACITOR		CK06CW472M
C15	SAME AS C1		
C16, C17, C18	SAME AS C2		
C19	SAME AS C10		
C20	CAPACITOR		CK06BX683M
C21, C22	SAME AS C2		
C23	CAPACITOR		CSR13B476M
C24	CAPACITOR		CSR13C336M
C25	SAME AS C1		
C26	SAME AS C2		
C27	SAME AS C24		
C28	SAME AS C1		
C29	SAME AS C10		
CR1-CR4	DIODE		JAN 1N277
MP1	BOARD, P.C.		
MP2	PAD, TRANSISTOR		10117
Q1-Q4	TRANSISTOR		JAN 2N2222
Q5	TRANSISTOR		JAN 2N3821
Q6, Q7	SAME AS Q5		
Q8	SAME AS Q5		
Q9-Q12	SAME AS Q1		
R1	RESISTOR, 3.3KΩ		RCR20G332KS
R2	RESISTOR, 10KΩ		RCR07G103KS
R3	RESISTOR, 1.2KΩ		RCR07G122KS
R4	RESISTOR, 8.2KΩ		RCR07G822KS

TABLE 5-1 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
R5	RESISTOR, 680Ω		RCR07G681KS
R6	SAME AS R2, 10KΩ		
R7	SAME AS R3, 1.2KΩ		
R8	SAME AS R4, 8.2KΩ		
R9	RESISTOR, 2.2KΩ		RCR07G222KS
R10	RESISTOR, 47Ω		RCR07G470KS
R11	RESISTOR, 1KΩ		RCR07G102KS
R12	SAME AS R10, 47Ω		
R13	RESISTOR, 470Ω		RCR07G471KS
R14	RESISTOR, 100KΩ		RCR07G104KS
R15	RESISTOR, 3.9KΩ		RCR07G392KS
R16	RESISTOR, 6.8KΩ		RCR07G682KS
R17	RESISTOR, 220Ω		RCR07G221KS
R18	SAME AS R4, 8.2KΩ		
R19	RESISTOR, 1.2KΩ		RCR20G122KS
R20	SAME AS R14, 100KΩ		
R21	RESISTOR, 4.7KΩ		RCR07G472KS
R22	RESISTOR, 330Ω		RCR07G331KS
R23	RESISTOR, 22KΩ		RCR07G223KS
R24	RESISTOR, 1.8KΩ		RCR07G182KS
R25	SAME AS R21, 4.7KΩ		
R26	SAME AS R17, 220Ω		
R27	SAME AS R23, 22KΩ		
R28	SAME AS R9, 2.2KΩ		
R29	SAME AS R10, 47Ω		
R30	SAME AS R13, 470Ω		
R31	SAME AS R14, 100KΩ		
R32	SAME AS R24, 1.8KΩ		
R33	SAME AS R22, 330Ω		
R34	SAME AS R23, 22KΩ		
R35	SAME AS R24, 1.8KΩ		
R36	SAME AS R21, 4.7KΩ		
R37	SAME AS R17, 220Ω		
R38	SAME AS R4, 8.2KΩ		
R39	SAME AS R15, 3.9KΩ		
R40	RESISTOR, 2.7KΩ		RCR07G272KS
R41	RESISTOR, 150Ω		RCR07G151KS
R42	SAME AS R3, 1.2KΩ		
R43, R44, R45	SAME AS R21, 4.7KΩ		
R46	RESISTOR, 100Ω		RCR07G101KS
R47	RESISTOR, 560Ω		
R48	SAME AS R1, 3.3KΩ		
R49	RESISTOR, 18KΩ		RCR07G183KS
R50	SAME AS R40, 2.7KΩ		
R51	SAME AS R46, 100Ω		
R52	SAME AS R11, 1KΩ		
R53	SAME AS R4, 8.2KΩ		
TP1	TEST POINT (Yellow)		3-582119-4
TP2	TEST POINT (Red)		3-582119-2

TABLE 5-2

SPEAKER/PHONE AMPLIFIER (PC-260)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1	CAPACITOR, 2.2 μF/20V		CSR13E225M
C2	CAPACITOR, 15 μF/20V		CSR13E156M
C3, C4, C5	SAME AS C1, 2.2 μF/20V		
C6	CAPACITOR, 47 μF/6V		CSR13B476M
C7	NOT USED		
C8	CAPACITOR, 0.1 μ		CK06BX104K
C9	SAME AS C6, 47 μF/6V		
C10	SAME AS C8, 0.1 μ		
C11	SAME AS C1, 2.2 μF/20V		
C12	NOT USED		
C13, C14	SAME AS C8, 0.1 μ		
C15	CAPACITOR, 100 μF/10V		CSR13C107M
C16	SAME AS C1, 2.2 μF/20V		
C17	SAME AS C2, 15 μF/20V		
C18	SAME AS C1, 2.2 μF/20V		
C19	NOT USED		
C20, C21	SAME AS C1, 2.2 μF/20V		
C22	SAME AS C6, 47 μF/6V		
C23	SAME AS C1, 2.2 μF/20V		
C24	SAME AS C6, 47 μF/6V		
CR1, CR2	DIODE		JAN 1N914
MP1	BOARD, P.C.		
MP2	PAD, TRANSISTOR		10117
MP3	PAD, TRANSISTOR		10197
MP4	PAD, TRANSISTOR		LC-T05038-4A
MP5	HEAT SINK		209-1.8
R1	RESISTOR, 15KΩ		RCR07G153KS
R2	RESISTOR, 2.2KΩ		RCR07G222KS
R3	RESISTOR, 6.8KΩ		RCR07G682KS
R4	RESISTOR, 1KΩ		RCR07G102KS
R5	RESISTOR, 330Ω		RCR07G331KS
R6, R7	RESISTOR, 33KΩ		RCR07G333KS
R8	RESISTOR, 82Ω		RCR07G820KS
R9	RESISTOR, 100Ω		RCR07G101KS
R10	RESISTOR, 4.7KΩ		RCR07G472KS
R11	RESISTOR, 8.2KΩ		RCR07G822KS
R12	RESISTOR, 3.3KΩ		RCR07G332KS
R13	RESISTOR, 10Ω		RCR07G100KS
R14	RESISTOR, 820Ω		RCR07G821KS
R15	RESISTOR, 470Ω		RCR07G471KS
R16	SAME AS R3, 6.8KΩ		
R17, R18	SAME AS R12, 3.3KΩ		
R19, R20	RESISTOR, 1/1W W.W		
R21	SAME AS R1, 15KΩ		
R22	SAME AS R2, 2.2KΩ		
R23	SAME AS R3, 6.8KΩ		
R24	SAME AS R4, 1KΩ		

TABLE 5-2 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
R25	SAME AS R5, 330Ω		
R26	SAME AS R12, 3.3KΩ		
R27	SAME AS R3, 6.8KΩ		
R28	RESISTOR, 5.6KΩ		RCR07G562KS
R29	RESISTOR, 1KΩ		RCR07G102KS
R30	RESISTOR, 27Ω		RCR07G270KS
R31	RESISTOR, 1.5KΩ		RCR07G152KS
R32	SAME AS R12, 3.3KΩ		
R33	SAME AS R14, 820Ω		
R34	RESISTOR, 560Ω		RCR07G561KS
R35	RESISTOR, 68Ω		RCR07G680KS
R36	SAME AS R15, 470Ω		
R37	RESISTOR, 470Ω		RCR07G471KS
R38	SAME AS R2, 2.2KΩ		
Q1-Q4	TRANSISTOR		JAN 2N2222
Q5	TRANSISTOR		JAN 2N1613
Q6, Q7	TRANSISTOR		JAN 2N2905
Q8	SAME AS Q5		
Q9-Q12	SAME AS Q1		
TP1, TP2, TP3	TEST POINT (Yellow)		3-582119-4

TABLE 5-3

SUBCARRIER-AMPLIFIER (PC-263)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1, 2, 3	CAPACITOR, 0.1 μF		CK06BX104M
C4	CAPACITOR, 100 μF/10V		CSR13C107M
C5-C8	SAME AS C1, 0.1 μF		
C9	CAPACITOR, 0.01 μF		CK06CW103M
C10, C11	SAME AS C1, 0.1 μF		
C12	SAME AS C208, 0.01 μF		CK06CW103M
C13, 14, 15	SAME AS C1, 0.1 μF		
C16	CAPACITOR, 390 pF		CM05FD391JP3
C17, 18	SAME AS C9, 0.01 μF		CK06CW103M
C19, 20, 21	SAME AS C1, 0.1 μF		CK06BX104M
C22	CAPACITOR, 180 pF		CM05FD181JP3
C23	SAME AS C9, 0.01 μF		
C24	SAME AS C1, 0.1 μF		
C25	SAME AS C9, 0.01 μF		
C26	SAME AS C1, 0.1 μF		
C27	SAME AS C9, 0.01 μF		
CR1, CR2	DIODE		JAN 1N914
CR3	DIODE		JAN 1N759A
L1	INDUCTOR, 330 μH	NYT	V1V330
L2	INDUCTOR, 680 μH	NYT	V1V680

TABLE 5-3 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
L3	INDUCTOR, 6.8 mH	NYT	Wee6800
MP1	BOARD, P.C.	P&B	
MP2	PAD, TRANSISTOR	MRO	10117
R1, R2	RESISTOR, 100Ω		
R3	RESISTOR, 1KΩ		
R4	RESISTOR, 100KΩ		
R5	RESISTOR, 47Ω		
R6	RESISTOR, 39KΩ		
R7	SAME AS R4, 100KΩ		
R8	RESISTOR, 4.7KΩ		
R9	RESISTOR, 470Ω		
R10	SAME AS R8, 4.7KΩ		
R11	SAME AS R6, 39KΩ		
R12	RESISTOR, 15KΩ		
R13	SAME AS R1, 100Ω		
R14, R15	SAME AS R8, 4.7KΩ		
R16	RESISTOR, 68Ω		
R17	RESISTOR, 2.2KΩ		
R18	RESISTOR, 18KΩ		
R19	RESISTOR, 10KΩ		
R20	SAME AS R6, 39KΩ		
R21	RESISTOR, 15KΩ		
R22	SAME AS R9, 470Ω		
R23	SAME AS R16, 68Ω		
R24	RESISTOR, 1.8KΩ		
R25	SAME AS R18, 18KΩ		
R26	RESISTOR, 27KΩ		
R27	SAME AS R17, 2.2KΩ, 1/2 W		
R28	RESISTOR, 47KΩ		
R29	SAME AS R21, 15KΩ		
R30	SAME AS R1, 100Ω		
R31	RESISTOR, 3.9KΩ		
R32	RESISTOR, 390Ω		
R33	SAME AS R31, 3.9KΩ		
R34	SAME AS R1, 100Ω		
R35	SAME AS R31, 47KΩ		
R36	SAME AS R21, 15KΩ		
R37	SAME AS R1, 100Ω		
R38	SAME AS R8, 4.7KΩ		
Q1-Q8	TRANSISTOR		JAN 2N1613

TABLE 5-4

BFO/DEMODULATOR, PC-264 PARTS LIST

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1-C6	CAPACITOR, 0.1 μF		CK06BX104M
C7-C8	CAPACITOR, 270 pF		CM05EF271JB
C9-C14	SAME AS C1, 0.1 μF		
C15	CAPACITOR, 18 pF		CM05CD180JP
C16	CAPACITOR, 0.01 μF		CK06CW103M
C17	SAME AS C1, 0.1 μF		
C18-C19	SAME AS C7, 270 pF		
C20-C24	SAME AS C1, 0.1 μF		
C25	SAME AS C16, 0.01 μF		
C26	SAME AS C16, 0.01 μF		
C27	SAME AS C16, 0.01 μF		
C28	SAME AS C1, 0.1 μF		
C29	CAPACITOR, 2.2 μF/15V		CSR13D226M
C30	SAME AS C16, 0.01 μF		
C31-C32	SAME AS C26, 0.01 μF		
C33	SAME AS C1, 0.1 μF		
C34	SAME AS C26, 0.01 μF		
C35	CAPACITOR, 470 pF		CM06FD471JP3
C36	SAME AS C16, 0.01 μF		
C37	SAME AS C1, 0.1 μF		
CR1	DIODE		JAN 1N759A
CR2	DIODE		JAN 1N971B
CR3-CR4	DIODE	EAS	VC56B
L1	INDUCTOR	NYT	ViV680
MP1	BOARD, P.C.	P&B	
MP2	PAD, TRANSISTOR	AMP	10117
MP3	PAD, TRANSISTOR	AMP	10197
MP4	SOCKET, CRYSTAL	AUG	80041G2
P1	CONNECTOR	WIN	
Q1-Q4	TRANSISTOR		JAN 2N2222
Q5	TRANSISTOR		JAN 2N2905
Q6	SAME AS Q1		
R1	RESISTOR, 120Ω		RCR07G121KS
R2	RESISTOR, 1KΩ		RCR07G102KS
R3	RESISTOR, 100Ω		RCR07G101KS
R4	RESISTOR, 8.2KΩ		RCR07G822KS
R5	RESISTOR, 12KΩ		RCR07G123KS
R6	RESISTOR, 5.6KΩ		RCR07G562KS
R7	RESISTOR, 27KΩ		RCR07G273KS
R8	SAME AS R6, 5.6KΩ		
R9	RESISTOR, 22KΩ		

TABLE 5-4 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
R10-R11	RESISTOR, 100KΩ		RCR07G104KS
R12	SAME AS R2, 1KΩ		
R13	RESISTOR, 1.8KΩ		RCR07G182KS
R14	RESISTOR, 3.3KΩ		RCR07G332KS
R15	RESISTOR, 470Ω		RCR07G471KS
R16	SAME AS R2, 1KΩ		
R17	SAME AS R1, 100Ω		
R18-R19	RESISTOR, 10KΩ		RCR07G103KS
R20	SAME AS R5, 12KΩ		
R21	SAME AS R6, 5.6KΩ		
R22	SAME AS R5, 12KΩ		
R23	SAME AS R7, 27KΩ		
R24	RESISTOR, 2.2KΩ		RCR07G222KS
R25	RESISTOR, 3.9KΩ		RCR07G392KS
R26	SAME AS R10, 100KΩ		
R27	SAME AS R15, 470Ω		
R28	SAME AS R10, 100KΩ		
R29	SAME AS R9, 22KΩ		
R30	SAME AS R3, 100Ω		
R31-R32	SAME AS R5, 12KΩ		
R33	SAME AS R7, 27KΩ		
R34	SAME AS R13, 1.8KΩ		
R35	RESISTOR, 6.8KΩ		RCR07G682KS
R36-R37	SAME AS R14, 3.3KΩ		
R38	RESISTOR, 56Ω		RCR07G560KS
R39	SAME AS R24, 2.2KΩ		
R40	RESISTOR, 82Ω		RCR07G820KS
R41	SAME AS R6, 5.6KΩ		
R42	SAME AS R4, 8.2KΩ		
R43	SAME AS R18, 10KΩ		
R44	RESISTOR, 47KΩ		RCR07G472KS
R45	SAME AS R18, 10KΩ		
R46	SAME AS R44, 4.7KΩ		
R47	RESISTOR, 10Ω		RCR07G100KS
R48	SAME AS R3, 100Ω		
TP1	TEST POINT	AMP	3-582119-4
Y1	CRYSTAL	P&B	20-37207-1
Y2	CRYSTAL	P&B	20-37207-2

TABLE 5-5

SUBCARRIER AND MODULATORS (PC-265)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1	CAPACITOR, 820 pF		CM06FD821JP3
C2	CAPACITOR, 0.1 μF		CK06BX104M
C3, C4	SAME AS C1, 820 pF		
C5	CAPACITOR, 0.01 μF		CK06CW103M
C6	SAME AS C2, 0.1 μF		
C7, C8	SAME AS C5, 0.01 μF		
C9	CAPACITOR, 1000 pF		CM06FD102JP3
C10	CAPACITOR, 180 pF		CM05FD181JP3
C11	SAME AS C2, 0.1 μF		
C12	CAPACITOR, 15 μF/20V		CSR13E156M
C13	CAPACITOR, 2.2 μF/20V		CSR13E225M
C14	NOT USED		
C15	CAPACITOR, 33 μF/10V		CSR13C336M
C16, C17, C18	SAME AS C13, 2.2 μF/20V		
C19, C20	SAME AS C5, 0.01 μF		
C21	SAME AS C1, 820 pF		
C22	SAME AS C10, 180 pF		
C23, C24	SAME AS C2, 0.1 μF		
CR1	DIODE		JAN 1N759A
CR2-CR6	DIODE		JAN 1N914
L1, L2	INDUCTOR		VIV 680
L3	INDUCTOR		1000
MP1	BOARD, P.C.		89244
MP2	MOUNT, CRYSTAL		8000 DG-1
MP3	PAD, TRANSISTOR		10117
MP4	PAD, TRANSISTOR		10197
Q1-Q5	TRANSISTOR		JAN 2N2222
Q6	TRANSISTOR		JAN 2N2905
Q7, Q8, Q9	SAME AS Q1		
R1	RESISTOR, 100KΩ		RCR07G104K3
R2, R3	RESISTOR, 15KΩ		RCR07G153K3
R4	RESISTOR, 22KΩ		RCR07G223K3
R5	RESISTOR, 100Ω		RCR07G101K3
R6	RESISTOR, 5.6KΩ		RCR07G562K3
R7, R8	SAME AS R2, 15KΩ		
R9	SAME AS R5, 100Ω		
R10	RESISTOR, 1KΩ		RCR07G102K3
R11	RESISTOR, 18Ω		RCR07G180K3
R12	SAME AS R1, 100KΩ		
R13	SAME AS R5, 100Ω		
R14	RESISTOR, 1MΩ		RCR07G105K3
R15	SAME AS R1, 100KΩ		
R16	RESISTOR, 1.5KΩ		RCR07G152K3
R17	SAME AS R1, 100KΩ		

TABLE 5-5 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
R18	RESISTOR, 27KΩ		RCR07G273K3
R19	RESISTOR, 6.8KΩ		RCR07G682K3
R20	SAME AS R5, 100Ω		
R21	RESISTOR, 1.2KΩ		RCR07G122K3
R22	RESISTOR, 1.5KΩ		RCR20G152K3
R23	SAME AS R1, 100KΩ		
R24	SAME AS R1, 100KΩ		
R25	RESISTOR, 680Ω		RCR07G681K3
R26	NOT USED		
R27	SAME AS R4, 22KΩ		
R28, R29	SAME AS R10, 1KΩ		
R30	RESISTOR, 39Ω		RCR07G390K3
R31	RESISTOR, 12KΩ		RCR07G123K3
R32	SAME AS R1, 100KΩ		
R33	SAME AS R5, 100Ω		
R34	SAME AS R6, 5.6KΩ		
R35	NOT USED		
R36	RESISTOR, 1.2KΩ		RCR20G122K3
R37	SAME AS R4, 22KΩ		
R38	RESISTOR, 4.7KΩ		RCR07G472K3
R39	RESISTOR, 1.8KΩ		RCR07G182K3
R40	SAME AS R38, 4.7KΩ		
R41, R42	SAME AS R19, 6.8KΩ		
R43	NOT USED		
R44	RESISTOR, 330Ω		RCR07G331K3
R45	RESISTOR, 47Ω		RCR07G470K3
R46	NOT USED		
R47	SAME AS R45, 47Ω		
T1, T2	TRANSFORMER		70-135-03
TP1	TEST POINT (Red)		3-582119-2
TP2, TP3	TEST POINT (Yellow)		3-582119-4
Y1	CRYSTAL, 455 kHz		CR-45/U

TABLE 5-6

SUBCARRIER AMPLIFIER/FILTER (PC-266)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1	CAPACITOR, 0.01 μF		CK06CW103M
C2, C3, C4	CAPACITOR, 0.1 μF		CK06BX104M
C5	CAPACITOR, 2.2 μF		CSR13E225M
C6	SAME AS C1, 0.01 μF		
C7	SAME AS C2, 0.1 μF		
C8	SAME AS C1, 0.01 μF		
C9	SAME AS C2, 0.1 μF		
C10	CAPACITOR, VARIABLE		CV31E600
C11	CAPACITOR, 100 pF		CM0EFD101JP-3
C12	SAME AS C10, VARIABLE		
C13	SAME AS C11, 100 pF		
C14	CAPACITOR, 2200 pF		CM06FD222JP-3
C15	SAME AS C11, 100 pF		
C16, C17	SAME AS C10, VARIABLE		
C18	SAME AS C11, 100 pF		
C19	CAPACITOR, 1200 pF		CM06FD122JP-3
C20, C21	SAME AS C2, 0.1 μF		
C22, C23	SAME AS C1, 0.01 μF		
C24, C25	SAME AS C2, 0.1 μF		
C26	SAME AS C5, 2.2 μF		
C27, C28	SAME AS C1, 0.01 μF		
C29, C30, C31	SAME AS C2, 0.1 μF		
C32	CAPACITOR, 1200 pF		CM06FD122JP-3
CR1-CR4	DIODE		JAN 1N914
CR5, CR6	DIODE		JAN 1N759A
FL1	FILTER		F455Y80 -
FL2	FILTER		F455Z14 -
K1	RELAY		20-37232-1
L1, L2	INDUCTOR		W EE 10, 000
MP1	BOARD, P.C.		
MP2	PAD, TRANSISTOR		10117
MP3	PAD, RELAY		RC-RP800000-2A
Q1-Q6	TRANSISTOR		JAN 2N2222
R1	RESISTOR, 6.8KΩ		RCR07G682K3
R2	RESISTOR, 1.2KΩ		RCR07G122K3
R3	RESISTOR, 100Ω		RCR07G101K3
R4	RESISTOR, 1KΩ		RCR07G102K3
R5	RESISTOR, 150Ω		RCR07G151K3
R6	RESISTOR, 390Ω		RCR07G391K3
R7	SAME AS R3, 100Ω		
R8	RESISTOR, 180Ω		RCR07G181K3
R9, R10	RESISTOR, 3.9KΩ		RCR07G392K3
R11	SAME AS R3, 100Ω		
R12	RESISTOR, 2.2KΩ		RCR07G222K3

TABLE 5-6 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
R13	RESISTOR, 240Ω		RCR07G241K3
R14	SAME AS R12, 22KΩ		
R15	NOT USED		
R16	RESISTOR, 4.7KΩ		RCR07G472K3
R17	SAME AS R9, 3.9KΩ		
R18	SAME AS R4, 1KΩ		
R19	SAME AS R5, 150Ω		
R20	SAME AS R6, 390Ω		
R21	SAME AS R3, 100Ω		
R22	SAME AS R1, 6.8KΩ		
R23	SAME AS R2, 1.2KΩ		
R24	SAME AS R16, 4.7KΩ		
R25	SAME AS R9, 3.9KΩ		
R26	NOT USED		
R27	SAME AS R12, 2.2KΩ		
R28	SAME AS R13, 240Ω		
R29	SAME AS R12, 2.2KΩ		
R30	SAME AS R1, 6.8KΩ		
R31, R32	SAME AS R9, 3.9KΩ		
R33	SAME AS R1, 6.8KΩ		
R34	SAME AS R8, 180Ω		
R35, R36	RESISTOR, 56Ω		RC426F560K
R37	RESISTOR, 6.8KΩ		RCR20G682K3
TP1	TEST POINT (Green)		3-582119-5
TP2	TEST POINT (Red)		3-582119-2
TP3, TP4	TEST POINT (Yellow)		3-582119-4

TABLE 5-7

PHONE/REMOTE SPEAKER AMPLIFIER (PC-268)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1, C2, C3	CAPACITOR, 2.2 μF/20V		CSR13E225M
C4	CAPACITOR, 15 μF/20V		CSR13E156M
C5	CAPACITOR, 22 μF/50V		CSR13G226M
C6, C7, C8	SAME AS C1, 2.2 μF/20V		
C9	CAPACITOR, 0.1 μF		CK06BX104M
C10	SAME AS C1, 2.2 μF/20V		
C11	NOT USED		
C12	SAME AS C1, 2.2 μF/20V		
C13	CAPACITOR, 47 μF/6V		CSR13B476M
C14	SAME AS C1, 2.2 μF/20V		
C15, C16	SAME AS C13, 47 μF/6V		
C17	CAPACITOR, 22 μF/15V		CSR13D226M
MP1	BOARD, P.C.		
MP2	PAD, TRANSISTOR		10117
Q1-Q8	TRANSISTOR		JAN 2N2222
R1	RESISTOR, 33KΩ		RCR07G333KS
R2	RESISTOR, 4.7KΩ		RCR07G472KS
R3, R4	NOT USED		
R5	RESISTOR, 2.7KΩ		RCR07G272KS
R6	RESISTOR, 220Ω		RCR07G221KS
R7	SAME AS R1, 33KΩ		
R8	RESISTOR, 910Ω		RCR07G911KS
R9	SAME AS R2, 4.7KΩ		
R10	RESISTOR, 47Ω		RCR07G470KS
R11	RESISTOR, 680Ω/1W		RCR32G681KS
R12	SAME AS R1, 33KΩ		
R13	SAME AS R2, 4.7KΩ		
R14, R15	NOT USED		
R16	SAME AS R5, 2.7KΩ		
R17	SAME AS R6, 220Ω		
R18	SAME AS R1, 33KΩ		
R19	SAME AS R8, 910Ω		
R20	SAME AS R2, 4.7KΩ		
R21	SAME AS R10, 47Ω		
R22	NOT USED		
R23	RESISTOR, 22KΩ		RCR07G223KS
R24	RESISTOR, 5.6KΩ		RCR07G562KS
R25	RESISTOR, 15KΩ		RCR07G153KS
R26	SAME AS R2, 4.7KΩ		
R27	SAME AS R5, 2.7KΩ		
R28	RESISTOR, 39KΩ		RCR07G393KS
R29	RESISTOR, 12KΩ		RCR07G123KS
R30	RESISTOR, 68KΩ		RCR07G683KS
R31	RESISTOR, 2.2KΩ		RCR07G222KS

TABLE 5-7 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
R32	RESISTOR, 27Ω		RCR07G270KS
R33	RESISTOR, 470Ω		RCR07G471KS
R34	SAME AS R5, 2.7KΩ		
R35	RESISTOR, 820Ω		RCR07G821KS
R36	RESISTOR, 560Ω		RCR07G561KS
R37	RESISTOR, 33Ω		RCR07G561KS
R38	RESISTOR, 150Ω		RCR07G151KS
TP1-TP4	TEST POINT (Green)		3-582179-5

TABLE 5-8

RECEIVER TRANSMITTER

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
A1	UHF PWR AMP	MPD	
A2	UHF EXCITER	P&B	11-3301
A3	UHF RCVR, 2	P&B	11-3296-1
A4	UHF RCVR, 4	P&B	11-3410-1
A5	MODULATOR	P&B	11-3297-1
A6	IF AMPLIFIER	P&B	11-3303-1
A7	HF PWR AMP	P&B	11-3300-1
A8	HF CONVERT	P&B	11-3294-1
A9	HF RCVR/EXC.	P&B	11-3299-1
A10	HF CONVERT	P&B	11-3293-1
A11	CONTROL CKT	P&B	11-3298-1
A12	LOOP, AMP	P&B	11-3292-1
A13	SHIELD	P&B	03-3355-1
A14	BRACKET	P&B	
C1	CAPACITOR		CL65BJ600MP3
CR1	DIODE		JAN 1N1614
CR2	DIODE		JAN 1N3189
CR3	DIODE		JAN 1N2813B
CR4	SAME AS CR2		
CR5	SAME AS CR3		
CR6	SAME AS CR2		
CR7	DIODE		JAN 1N5339
CR8	DIODE		1N270
J1*	CONNECTOR (on cable 03-3378)		
J2**	CONNECTOR (on cable 03-3379)		
J3	CONNECTOR		XSF-C-BCL
J4	CONNECTOR	WIN	HB15S1
J5	CONNECTOR	WIN	HB18S1
J6	CONNECTOR	P&B	20-37204-1
J7, J8	SAME AS J5		
J9	SAME AS J4		

TABLE 5-8 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
J10	SAME AS J5		
K1	RELAY MIDTEX/AEMCO COAX	26.5VDC 600Ω	#1536094 50W RF
K2	RELAY MIDTEX/AEMCO COAX	26.5VDC 600Ω	#1536092 50W RF 2A-26V AUX
MP1	BRACKET	P&B	03-3380-1
MP2	BRACKET	P&B	03-3381-1
MP3	PIVOT	P&B	04-3382-1
MP4	PIVOT	P&B	04-3382-8
MP5	PIVOT	P&B	04-3382-8
MP6	INSULATOR	P&B	04-13724-1
MP7	INSULATOR	P&B	04-13724-2
MP8	BRACKET		03-13719-1
MP9	BRACKET		03-13720-1
MP10	INSULATOR		04-13756-1
MP11	INSULATOR		04-13757-1
MP12	NUT, ANCHOR		06-23661-1
MP13	BRACKET		04-23664-1
MP14	NUT		04-23676-1
MP15	SCREW	P&B	04-23676-2
MP16	HEAT SINK	P&B	04-23691-1
MP17	SPACER	P&B	04-23692-1
MP18	SPACER	P&B	04-23692-2
MP19	PLATE, ANTI ROT.	P&B	04-23700-1
MP20	POST	P&B	04-23702-1
MP21	GROMMET		MS21265-A4N
MP22	O RING		MS28775-5
MP23	O RING		MS29513-257
MP24	O RING		MS29513-28
MP25	SETSCREW		MS51963-15
MP26	RET. RING		MS90707-4012
MP27	RET. RING		MS16630-4100
MP28	GASKET, R.F.	MTX	10-006
MP29	TERMINAL		1480D
MP30	TERMINAL	CTC	2051-1
MP31	WASHER		02-748-113
MP32	MOUNT		TM258C
MP33	CABLE TIE		SST4C
MP34	CLAMP, CABLE	TA-	TA713DO5
MP35	CLAMP, CABLE	WEK	3-16-4
MP36	CLAMP, CABLE	WEK	3-8-4
MP37	INSULATOR		495320
MP38	WASHER SHLD		495334-7
MP39	SEALSCREW		5-8-32x5-8
MP40	SPACER	P&B	04-23704-1
MP41	SCREW	P&B	04-23/05-1
MP42	ADAPTOR	P&B	04-23708-1
R1	RESISTOR	DALE	RE65 30 OHM

TABLE 5-8 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
R2	RESISTOR		RC20GF500J
R3	RESISTOR		RC32GF330J
R4	RESISTOR		RE65 150 OHM
R5	LOAD CELL	P&B	20-37220-1

TABLE 5-9

UHF EXCITER (PC-189)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
A1-A4	EXCITER CHANNEL	P&B	11-3302-1
CR1-CR8	DIODE		JAN 1N914
CR9	DIODE		JAN 1N753A
MP1	BOARD, MACH & MARK	P&B	04-13635-1
R1, R2, R3, R4	RESISTOR, 560Ω/3W		RCR20G152KS
R5	RESISTOR, 4.7KΩ		
C1-C6	CAPACITOR, 0.0015 μF		

TABLE 5-10

UHF EXCITER CHANNEL (PC-190)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1, C2, C3	CAPACITOR, 0.0015 μF		CK60AW152M
C4	CAPACITOR, 1.6-16 pF	JON	189-506-5
C5	CAPACITOR, 0.0015μF		CM05-CD100JP3
C6, C7	SAME AS C1, 0.0015 μF		
C8	SAME AS C4, 1.6-16 pF		
C9	SAME AS C1, 0.0015 μF		
C10	SAME AS C4, 1.6-16 pF		
C11	SAME AS C1, 0.0015 μF		
C12	SAME AS C1, 0.0015 μF		
C13	SAME AS C4, 1.6-16 pF		
C14	SAME AS C1, 0.0015 μF		
C15-C18	SAME AS C1, 0.0015 μF		
L1	INDUCTOR	P&B	
L2	INDUCTOR	NYT	DD-039
L3*	*L3, L4, & L5 ARE ETCHED		
L4*	IN FOIL OF P.C. BOARD		
L5*			
MP1	BOARD, P.C.	P&B	
Q1, Q2	TRANSISTOR		JAN 2N2857
Q3	TRANSISTOR		2N3866
R1, R2	RESISTOR, 2.7KΩ		RCR07G272KS
R3	RESISTOR, 33Ω		RCR07G561KS
R4	RESISTOR, 150Ω		RCR07G151KS
R5	SAME AS, 560Ω		
R6	RESISTOR, 1.8KΩ		RCR07G182KS
R7	RESISTOR, 5.6KΩ		RCR07G562KS
R8	RESISTOR, 1.2KΩ		RCR07G122KS
R9	SAME AS, 560Ω		
R10	RESISTOR, 180Ω		RCR07G181KS
R11	RESISTOR, 12KΩ		RCR07G123KS
R12	RESISTOR, 3.3KΩ		RCR07G332KS
R13	SAME AS, 560Ω		
R14	SAME AS R4, 150Ω		
Y1	CRYSTAL	P&B	21-37265-1

TABLE 5-11

UHF RECEIVER, TYPE 2 (PC-184)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
A1, A2	RECEIVER, CHNL	P&B	11-3377-1
MP1	BOARD, MACH & MARK	P&B	

TABLE 5-12

RECEIVER CHANNEL (PC-277)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1, C2	CAPACITOR, 0.0015 μF		CK60AW152M
C3	CAPACITOR, 0.0015 μF		CM05CD070JA3
C4, C5	SAME AS C1, 0.0015 μF		
C6	CAPACITOR, 0.0015 μF		JON 189-506-5
C7	SAME AS, 1-16 pF		
C8, C9	CAPACITOR, 0.0015 μF		CM05DD560JA3
C10, C11	SAME AS C1, 0.0015 μF		
C12	SAME AS C6, 1-16 pF		
C13	SAME AS C1, 0.0015 μF		
C14	CAPACITOR. 56 pF		CM05CD020D03
C15	CAPACITOR, 75 pF		CM05DD680JP3
C16	SAME AS C1, 0.0015 μF		
C17	SAME AS, 56 pF		
C18	CAPACITOR, 240 pF		CM05DD121JP3
C19-C22	SAME AS C1, 0.0015 μF		
C23	SAME AS C6, 1.6-16 pF		
C24	CAPACITOR, 10 pF		CM05CD100JP3
C25	SAME AS C1, 0.0015 μF		
C26	SAME AS, 1.6-16 pF		
C27	SAME AS C1, 0.0015 μF		
C28, C30	SAME AS, 0.0015 μF		
CR1, CR2	DIODE		JAN 1N914
L1*	*L1, L2, L3 AND L8 ARE ETCHED		
L2*	IN FOIL ON P.C. BOARD		
L3*			
L4	CHOKE, DECIDUCTOR	NYT	DD-O-39
L5	CHOKE	DAL	2041-23
L6	INDUCTOR	P&B	
L7	SAME AS L4		
L8*			
MP1	BOARD, MACH & MARK	P&B	
MP2	PAD, TRANSISTOR	MRO	10117
Q1-Q5	TRANSISTOR		JAN 2N2857
R1	RESISTOR, 1KΩ		RCR07G102KS
R2	RESISTOR, 5.6KΩ		RCR07G152KS
R3	RESISTOR, 2.2KΩ		RCR07G222KS
R4	SAME AS, 1.5KΩ		
R5	RESISTOR, 180Ω		RCR07G181KS
R6	RESISTOR, 6.8KΩ		RCR07G182KS
R7	RESISTOR, 2.2KΩ		RCR07G682KS
R8	RESISTOR, 100Ω		
R9	RESISTOR, 1KΩ		
R10	RESISTOR, 100Ω		RCR07G101KS
R11	RESISTOR, 330Ω		RCR07G331KS
R12	RESISTOR, 8.2KΩ		RCR07G392KS
R13	RESISTOR, 2.7KΩ		

TABLE 5-12 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
R14	RESISTOR, 390Ω		RCR07G391KS
R15	RESISTOR, 1.5KΩ		
R16	RESISTOR, 2.2KΩ		
R17	RESISTOR, 2.7KΩ		RCR07G272KS
R18	RESISTOR, 22KΩ		
R19	RESISTOR, 2.7KΩ		RCR07G151KS
R20	RESISTOR, 560Ω		RCR07G561KS
R21	RESISTOR, 120Ω		
R22	RESISTOR, 5.6KΩ		RCR07GF562KS
R23	RESISTOR, 1.2KΩ		RCR07G122KS
R24	RESISTOR, 560Ω		
R25	RESISTOR, 150Ω		
R26	RESISTOR, 100Ω		
R27	RESISTOR, 1.5KΩ		
R28	RESISTOR, 1KΩ		
R29	RESISTOR, 1KΩ		
R30	RESISTOR, 1.8KΩ		
R31	RESISTOR, 1KΩ		
Y1	CRYSTAL	P&B	21-37265-1

TABLE 5-13

UHF DISTRIBUTION #1

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
A1	UHF RCVR CHANNEL (PC-277)		11-3377
A2	UHF RCVR CHANNEL (PC-277)		11-3377
C1	CAPACITOR		
C2	CAPACITOR		
C3	CAPACITOR		
CR1-CR6	DIODE		1N914
CR7	DIODE		
MP1	P.C. BOARD	P&B	
MP2	TERMINAL	CTC	
MP3	TERMINAL	CTC	
MP4	STANDOFF	CTC	
R1	RESISTOR		
R2	RESISTOR		

TABLE 5-14

UHF MODULATOR (PC-185)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1	NOT ASSIGNED		
C2	CAPACITOR, 0.022 μF		CK06BX223M
C3	CAPACITOR, 150 μF/15V		CSR13D157ML
C4	SAME AS C2, 0.022 μF		
C5	NOT ASSIGNED		
C6	CAPACITOR, 6800 pF		CK62AW682M
C7	CAPACITOR, 2.2 μF/20V		CSR13E225ML
C8	NOT ASSIGNED		
C9	SAME AS C6, 6800 pF		
C10	CAPACITOR, 10 μF/20V		CSR13E106ML
C11	SAME AS C7, 2.2 μF/20V		
CR1	DIODE		JAN 1N963B
CR2, CR3	DIODE		JAN 1N914
CR4	DIODE		JAN 1N753A
MP1	BOARD, P.C.		
MP2	PAD, TRANSISTOR	MRO	10197 DAP
MP3	PAD, TRANSISTOR	MRO	10117
Q1	TRANSISTOR		JAN 2N2608
Q2, Q3	TRANSISTOR		JAN 2N1613
Q4	TRANSISTOR		JAN 2N2905
Q5, Q6, Q7	SAME AS Q2		JAN 2N1613
Q8	SAME AS Q4		JAN 2N2905
Q9, Q10	SAME AS Q2		JAN 2N1613
Q11	SAME AS Q4		JAN 2N2905
R1	RESISTOR, 68KΩ		RCR07G683KS
R2	RESISTOR, 220KΩ		RCR07G224KS
R3	RESISTOR, 180KΩ		RCR07G184KS
R4	RESISTOR, 270KΩ		RCR07G274KS
R5	RESISTOR, 100KΩ		RCR07G104KS
R6	RESISTOR, 15KΩ		RCR07G153KS
R7	RESISTOR, 27KΩ		RCR07G273KS
R8	RESISTOR, 560Ω		RCR07G561KS
R9	RESISTOR, 12KΩ		RCR07G123KS
R10	RESISTOR, 1.5KΩ, 1/2 W		RCR07G152KS
R11	RESISTOR, 10KΩ		RCR07G103KS
R12, R13	RESISTOR, 1KΩ		RCR07G102KS
R14*	*NOT ASSIGNED		
R15	RESISTOR, 5.6KΩ		RCR07G472KS
R16, R17	SAME AS R11, 10KΩ		
R18	RESISTOR, 2.2KΩ		RCR07G222KS
R19	RESISTOR, 82KΩ		RCR07G823KS
R20	RESISTOR, 68KΩ		RCR07G223KS
R21	SAME AS R11, 10KΩ		
R22	SAME AS R2, 220KΩ		
R23	RESISTOR, 39KΩ		RCR07G393KS

TABLE 5-14 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
R24	RESISTOR, 1.2KΩ		RCR07G122KS
R25, R26	SAME AS R5, 100KΩ		
R27	SAME AS R11, 10KΩ		
R28	RESISTOR, 68KΩ		RCR07G623KS
R29	SAME AS R9, 12KΩ		
R30	SAME AS R28, 68KΩ		
R31, R32	SAME AS R11, 10KΩ		
R33	RESISTOR, 47KΩ		RCR07G473KS
R34	SAME AS R31, 10KΩ		
R35, R36	SAME AS R15, 4.7KΩ		
R37	RESISTOR, 3.9KΩ		RCR07G392KS

TABLE 5-15

IF AMPLIFIER (PC-191)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1	CAPACITOR, 2.2 μF/20V		CSR13E225KL
C2	CAPACITOR, 0.0015 μF		CM05DD151JP3
C3	CAPACITOR, 0.0015 μF		CK60AW152M
C4	CAPACITOR, 62 pF		CM05DD560JP3
C5	CAPACITOR, 120 pF		CM05DD121JP3
C6, C7, C8	SAME AS C3, 0.0015 μF		
C9	SAME AS C4, 62 pF		
C10	SAME AS C5, 120 pF		
C11, C12	SAME AS C3, 0.0015 μF		
C13	SAME AS C4, 56 pF		
C14	SAME AS C5, 240 pF		
C15, C16, C17	SAME AS C3, 0.0015 μF		
C18	CAPACITOR, 43 pF		CM05DD390JP3
C19, C20	SAME AS C3, 0.0015 μF		
C21	CAPACITOR, 470 pF		
C22	SAME AS C1, 2.2 μF/20V		
C23, C24	SAME AS C2, 0.0015 μF		
C25	CAPACITOR, 0.0015 μF		CM05CD100JP3
C26	CAPACITOR, 0.0015 μF		CM05DD680JP3
C27	CAPACITOR, 3 pF		CM05DD220JP3
C28	CAPACITOR, 5 pF		
C29	CAPACITOR, 0.0015 μF		
C30	CAPACITOR, 5 pF		
C31	CAPACITOR, 5 pF		
C32	CAPACITOR, 5 pF		
CR1	DIODE		JAN 1N963B
CR2	DIODE		JAN 1N914
CR3	SAME AS CR2		
FL1	FILTER	CLV	QUOTE #8755
L1	INDUCTOR, 3.3 μH	NYT	DD-3.30
L2	INDUCTOR, 3.3 μH	NYT	DD-1.50
L3-L6	INDUCTOR	DALE	2041-23
MP1	BOARD, P.C.	P&B	
MP2	PAD, TRANSISTOR	MRO	
Q1-Q4	TRANSISTOR		JAN 2N2857
Q5-Q8	TRANSISTOR		JAN 2N2222
R1	RESISTOR, 680Ω/1W		RCR32G681KS
R2	RESISTOR, 1.8KΩ		RCR07G472KS
R3	RESISTOR, 18KΩ		RCR07G183KS
R4	RESISTOR, 8.2KΩ		RCR07G822KS
R5	RESISTOR, 1.2KΩ		RCR07G182KS
R6	RESISTOR, 2.2KΩ		RCR07G222KS
R7	NOT ASSIGNED		
R8	RESISTOR, 470Ω		RCR07G471KS
R9	RESISTOR, 15KΩ		RCR07G153KS
R10	SAME AS R4, 8.2KΩ		

TABLE 5-15 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
R11	RESISTOR, 1.8KΩ		
R12	SAME AS R6, 2.2KΩ		
R13	SAME AS R8, 470Ω		
R14	SAME AS R9, 15KΩ		
R15	RESISTOR, 12KΩ		RCR07G123KS
R16	SAME AS R5, 1.8KΩ		
R17	SAME AS R6, 2.2KΩ		
R18	SAME AS R8, 470Ω		
R19	RESISTOR, 6.8KΩ		RCR07G682KS
R20	RESISTOR, 2.7KΩ		RCR07G272KS
R21	SAME AS R5, 1.8KΩ		
R22	SAME AS R8, 270Ω		
R23	RESISTOR, 220Ω		RCR07G221KS
R24	RESISTOR, 12KΩ		RCR07G223KS
R25	RESISTOR, 3.3KΩ		RCR07G332KS
R26	RESISTOR, 1KΩ		RCR07G102KS
R27	RESISTOR, 220KΩ		RCR07G104KS
R28	SAME AS R26, 1KΩ		
R29	SAME AS R24, 22KΩ		
R30	RESISTOR, 56Ω		RCR07G561KS
R31	SAME AS R8, 470Ω		
R32, R33	SAME AS R24, 39K, 22KΩ		
R34	SAME AS R8, 470Ω		
R35	RESISTOR, 47Ω		RCR07G470KS
R36	SAME AS R8, 470Ω		
R37, R38, R39	RESISTORS, 27Ω		RCR07G270KS
R40	RESISTOR, 4.7KΩ		
R41	RESISTOR, 4.7KΩ		
R42	RESISTOR, 150Ω		
R43	RESISTOR, 10Ω, 1/8 W		
R44	RESISTOR, 10Ω, 1/8 W		
R45	RESISTOR, 270KΩ		

TABLE 5-16

HF POWER AMPLIFIER (PC-188)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
A1	MATCHING NETWORK #1	P&B	03-13748-1
A2	MATCHING NETWORK #2	P&B	03-13748-2
A3	MATCHING NETWORK #3	P&B	03-13748-3
A4	MATCHING NETWORK #4	P&B	03-13748-4
A5	MATCHING NETWORK #5	P&B	03-13748-5
A6	MATCHING NETWORK #6	P&B	03-13748-6
A7	MATCHING NETWORK #7	P&B	03-13748-7
C1-C14	HAVE BEEN ASSIGNED TO MATCHING NETWORKS		
C15	CAPACITOR, 470 pF		CM05FD201JP3
C16	CAPACITOR, 0.1 μF		CM06FD471JP3
C17, C18	CAPACITOR, 0.1 μF		CM06BX104M
C19	CAPACITOR, 2.2 μF/20V		CSR13E225KL
C20	CAPACITOR, 33 μF/35V		CSR13F336KL
C21-C33	SAME AS C17, 0.1 μF		
C34	CAPACITOR, 6.8 μF/35F		
C35-C39	SAME AS C17, 0.1 μF		
C40	CAPACITOR, 100 μF/10V		CSR13C107ML
C41	CAPACITOR, 0.1 μF		
C42, C43, C44	SAME AS C17, 0.1 μF		
CR1	DIODE		JAN 1N753A
CR2	DIODE		JAN 1N914
CR3	DIODE		JAN 1N754A
CR4, CR5	DIODE		JAN 1N750A
CR6-CR10	SAME AS CR2		
CR11	DIODE		JAN 1N752
CR12	SAME AS CR2		
CR13	SAME AS CR3		
CR14	DIODE		JAN 1N759A
E1-E4	TERMINAL	CTC	2971-2
E5, E6	TERMINAL	CTC	2043-2
E7-E13	TERMINAL	CTC	1597-2
E14-E17	SAME AS E7		
E18-E34	SAME AS E7		
L1-L4	COIL	P&B	21-37244-1
L5, L6	COIL	P&B	21-37245-1
L7, L8	COIL	P&B	21-37246-1
MP1	BOARD, P.C.	P&B	
MP2	PAD, TRANSISTOR	MRO	10117
MP3	PAD, TRANSISTOR	MRO	10197
MP4	HEAT SINK	P&B	03-13713-1
MP5	STANDOFF	CTC	2081-4
MP6	STANDOFF, INS	SEL	FT-SM025-TUR
Q1, Q2, Q3	TRANSISTOR		JAN 2N2222
Q4, Q5, Q6	TRANSISTOR		2N4041
Q7, Q8	TRANSISTOR		2N5070

TABLE 5-16 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
Q9	TRANSISTOR		2N3947
Q10	TRANSISTOR		JAN 3251A
Q11	TRANSISTOR		2N3946
R1	RESISTOR, 68Ω		RCR07G680KS
R2	RESISTOR, 1.3KΩ		RCR07G132KS
R3	RESISTOR, 1KΩ		RCR07G102KS
R4	RESISTOR, 56Ω		RCR07G560KS
R5	RESISTOR, 200Ω		RCR07G201KS
R6	RESISTOR, 1.5KΩ		RCR07G332KS
R7	SAME AS R3, 1KΩ		
R8	SAME AS R2, 1KΩ		
R9, R10	RESISTOR, 33Ω		RC05GF330K
R11	RESISTOR, 39Ω		RCR07G390KS
R12	RESISTOR, 120Ω		RC05GF471K
R13	SAME AS R11, 39Ω		
R14	SAME AS R12, 120Ω		
R15-R22	RESISTOR, 2.7Ω		RCR07G2R7KS
R23	RESISTOR, 9.1KΩ		RCR07G912KS
R24	RESISTOR, 510Ω		RCR07G511KS
R25	SAME AS R5, 200Ω		
R26, R27	RESISTOR, 1/1W W.W.	DALE	RS1A-1W
R28	SAME AS R24, 510Ω		
R29	RESISTOR, 12KΩ		RCR07G123KS
R30	SAME AS R5, 200Ω		
R31	RESISTOR, 3.3KΩ		RCR07G362KS
R32	RESISTOR, 51KΩ		RCR07G513KS
R33	RESISTOR, 10KΩ		RCR07G432JS
R34	SAME AS R5, 200Ω		
R35	RESISTOR, 47Ω		RCR07G470KS
R36	RESISTOR, 100Ω		RCR07G101KS
R37, R38	RESISTOR, 15Ω		RC05F221K
R39	SAME AS, 680Ω, 1/2W		
R40	SAME AS R26, 1/1W W.W.		
R41	RESISTOR, 47Ω, 1/2W		
R42	RESISTOR, 560Ω		
R43	RESISTOR, 47Ω		
T1	TRANSFORMER	P&B	21-37239-1
T2	TRANSFORMER	P&B	21-37240-1
T3	TRANSFORMER	P&B	21-37241-1
T4	TRANSFORMER	P&B	21-37242-1
T5, T6	TRANSFORMER	P&B	21-47243-1
T7	SAME AS T4	P&B	21-37242-1

TABLE 5-17

MATCHING NETWORK NO. 1 (PC-270)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1	CAPACITOR, 1-75 pF		PC39J750
K1	RELAY	P&B	21-37255-1
MP1	BOARD, P.C.	P&B	
T1	TRANSFORMER	P&B	21-37247-1

TABLE 5-18

MATCHING NETWORK NO. 2 (PC-290-2)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1	CAPACITOR, 1-75 pF		PC39J750
K1	RELAY	P&B	21-37255-1
MP1	BOARD, P.C.	P&B	
T1	TRANSFORMER	P&B	21-37248-1

TABLE 5-19

MATCHING NETWORK NO. 3 (PC-291)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1	CAPACITOR, 1-75 pF		PC39J750
C2	CAPACITOR, 68 pF		CM05ED680JP3
K1	RELAY	P&B	21-37255-1
L1	COIL	P&B	21-37249-1
L2	COIL	P&B	21-37250-1
MP1	BOARD, P.C.	P&B	

TABLE 5-20

MATCHING NETWORK NO. 4 (PC-292)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1	CAPACITOR, 620 pF		CM06FD621JP3
C2	CAPACITOR, 330 pF		CM05FD331JP3
K1	RELAY	P&B	21-37255-1
L1	COIL	P&B	21-37251-1
L2	COIL	P&B	21-37252-1
MP1	BOARD, P.C.	P&B	

TABLE 5-21

MATCHING NETWORK NO. 5 (PC-273)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1	CAPACITOR, 620 pF		CM06FD621JP3
C2	CAPACITOR, 470 pF		CM06FD471JP3
C3	CAPACITOR, 2400 pF		CM06FD242JP3
C4	CAPACITOR, 1000 pF		CK05BX102M
K1	RELAY	P&B	21-37255-1
L1	COIL	P&B	21-37253-1
MP1	BOARD, P.C.	P&B	

TABLE 5-22

MATCHING NETWORK NO. 6 (PC-294-1)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1	CAPACITOR, 68 μF		CM05ED680JP3
C2	CAPACITOR, 1-75 pF		PC39J750
C3	CAPACITOR, 6800 pF		CK06CW682M
C4	CAPACITOR, 390 pF		CM05FD391JP3
K1	RELAY	P&B	
L1	COIL	P&B	
MP1	BOARD, P.C.	P&B	

TABLE 5-23

MATCHING NETWORK NO. 7 (PC-294-2)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1	CAPACITOR, 68 pF		CM05ED680JP3
C2	CAPACITOR, 1-75 pF		PC39J750
C3, C4	CAPACITOR, 120 pF		CM05FD121JP3
K1	RELAY	P&B	21-37255-1
L1	COIL	P&B	21-37254-1
MP1	BOARD, P.C.	P&B	

TABLE 5-24

SECOND HF CONVERTER (PC-182)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
A1	MIXER, 455 kHz	P&B	03-3404-1
A1CR1-A1CR4	DIODE		JAN 1N914
A1MP1	HEADER		2501
A1MP2	SHELL		2001
A1MP3	BOARD	P&B	03-13752-1
A1MP4	BOARD	P&B	03-13752-2
A1T1	TRANSFORMER	P&B	21-37256-1
A1T2	TRANSFORMER	P&B	21-37257-1
C1	CAPACITOR, 240 pF		
C2	CAPACITOR, 0.01 μF		CK06BX103M
C3, C4, C5	CAPACITOR, 0.001 μF		CK06AW102M
C6	CAPACITOR, 680 pF		CM06FD681
C7	SAME AS C2, 0.01 μF		
C8	CAPACITOR, 470 pF		CM06FD471JP3
C9, C10	SAME AS C2, 0.01 μF		
C11	SAME AS C3, 0.001 μF		
C12	NOT ASSIGNED		
C13	CAPACITOR, 2.2 μF/20V		CSR13E225M
C14, C15	CAPACITOR, 0.1 μF		CK06BX104M
C16	CAPACITOR, 22 μF/15V		CSR13B157M
C17	SAME AS C2, 0.01 μF		
C18	SAME AS C3, 0.001 μF		
C19	SAME AS C2, 0.01 μF		
C20	SAME AS C1, 240 pF		
C21	CAPACITOR, 75 pF		
CR1, CR2	DIODE		JAN 1N914
CR3	DIODE		JAN 1N753A
CR4	DIODE		JAN 1N758A
CR5, CR6	DIODE		JAN 1N270
L1	CHOKE, 270 μH	NYT	MS90537-42(SWD-270)
L2	CHOKE, 39 μH	NYT	MS90537-32(SWD-39)
L3, L4	CHOKE, 330 μH	NYT	MS90537-43(SWD-330)
MP1	BOARD, P.C.	P&B	
MP2	PAD, TRANSISTOR	MRO	10117
MP3	PAD, CAPACITOR	MRO	10120
MP4	SOCKET, CRYSTAL	AUG	8000-DG1
Q1-Q8	TRANSISTOR		JAN 2N2222
R1, R2	RESISTOR, 1KΩ		RCR32G102KS
R3	RESISTOR, 100Ω		RCR07G101KS
R4, R5	RESISTOR, 10KΩ		RCR07G103KS
R6	RESISTOR, 6.8KΩ		RCR07G682KS
R7	RESISTOR, 2.2KΩ		RCR07G222KS

TABLE 5-24 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
R8	RESISTOR, 1.5KΩ		RCR07G152KS
R9	RESISTOR, 10Ω		RCR07G100KS
R10	NOT ASSIGNED		
R11	SAME AS R8, 1.5KΩ		
R12	RESISTOR, 47KΩ		RCR07G473KS
R13	SAME AS R4, 10KΩ		
R14	RESISTOR, 39KΩ		RCR07G393KS
R15	RESISTOR, 5.6KΩ		
R16	SAME AS R7, 2.2KΩ		
R17	RESISTOR, 330Ω		RCR07G331KS
R18	SAME AS R7, 2.2KΩ		
R19	RESISTOR, 270Ω		RCR07G271KS
R20, R21	SAME AS R12, 47KΩ		
R22	RESISTOR, 100KΩ		RCR07G104KS
R23	SAME AS R3, 100Ω		
R24	RESISTOR, 91Ω		RCR07G910KS
R25	RESISTOR, 1KΩ		RCR07G102KS
R26	SAME AS R3, 100Ω		
R27	RESISTOR, 56KΩ		RCR07G563KS
R28	SAME AS R3, 100Ω		
R29	SAME AS R9, 10Ω		
R30	RESISTOR, 1.2KΩ		RCR07G122KS
R31	SAME AS R3, 100Ω		
R32	SAME AS R22, 100KΩ		
R33	RESISTOR, 22KΩ		RCR07G223KS
R34	RESISTOR, 15KΩ		RCR07G153KS
Y1	CRYSTAL, 1145.000 kHz		20-37208-1

TABLE 5-25

HF RECEIVER/EXCITER (PC-187)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
C1	CAPACITOR, 1000 pF		CK05CW102M
C2, C3	CAPACITOR, 0.01 μF		CK06CW103M
C4	CAPACITOR, 150 pF		CM05CD150JP3
C5, C6	CAPACITOR, 0.01 μF		CK12BX103K
C7, C8	SAME AS C2, 0.01 μF		
C9	SAME AS C5, 0.01 μF		
C10, C11	SAME AS C2, 0.01 μF		
C12	SAME AS C5, 0.01 μF		
C13	NOT ASSIGNED		
C14, C15	SAME AS C2, 0.01 μF		
C16, C17	SAME AS C5, 0.01 μF		
C18	SAME AS C2, 0.01 μF		
C19	CAPACITOR, 0.1 μF		CK06BX104M
C20	SAME AS C2, 0.01 μF		
C21	SAME AS C19, 0.1 μF		
C22	CAPACITOR, 2.2 μF/50V		CSR13G225ML
C23	CAPACITOR, 10 μF/20V		CSR13G106ML
C24	SAME AS C2, 0.01 μF		
C25	SAME AS C5, 0.01 μF		
C26, C27	SAME AS C2, 0.01 μF		
C28	SAME AS C19, 0.1 μF		
C29	SAME AS C5, 0.01 μF		
CR1-CR16	DIODE		1N914A
CR17	DIODE		JAN 1N758A
CR18	DIODE		JAN 1N753A
E1	TERMINAL	CTC	1597-2
L1, L2	COIL	NYT	DD-12.0
L3	COIL	NYT	DD-1.00
L4, L5	SAME AS L1		
MP1	BOARD, P.C.	P&B	
MP2	PAD, TRANSISTOR	MRO	10117
Q1-Q4	TRANSISTOR		JAN 2N2222
Q5	TRANSISTOR		JAN 2N830
Q6-Q11	SAME AS Q1		
R1, R2	RESISTOR, 10KΩ		RCR07G103KS
R3	RESISTOR, 220Ω		RCR07G221KS
R4	RESISTOR, 680Ω		RCR07G681KS
R5	RESISTOR, 120Ω		RCR07G121KS
R6	SAME AS R1, 10KΩ		
R7-R10	RESISTOR, 1.2KΩ		RCR07G122KS
R11, R12	RESISTOR, 2.7KΩ		RCR07G272KS
R13	NOT ASSIGNED		

TABLE 5-25 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
R14	RESISTOR, 22Ω		RCR07G220KS
R15	RESISTOR, 180Ω		RCR07G181KS
R16	RESISTOR, 100Ω		RCR07G101KS
R17	SAME AS R11, 2.7KΩ		
R18	RESISTOR, 6.8KΩ		RCR07G682KS
R19	SAME AS R1, 10KΩ		
R20	SAME AS R18, 6.8KΩ		
R21	SAME AS R16, 100Ω		
R22	RESISTOR, 3.3KΩ		RCR07G332KS
R23, R24	SAME AS R1, 10KΩ		
R25-R29	SAME AS R7, 1.2KΩ		
R30	SAME AS R11, 2.7KΩ		
R31	RESISTOR, 22KΩ		RCR07G223KS
R32, R33	SAME AS R1, 10KΩ		
R34	RESISTOR, 15KΩ		RCR07G153KS
R35	RESISTOR, 470Ω		RCR07G471KS
R36	RESISTOR, 15KΩ		RCR07G153KS
R37	RESISTOR, 68KΩ		RCR07G683KS
R38	SAME AS R31, 22KΩ		
R39, R40	RESISTOR, 2.2KΩ		RCR07G222KS
R41	NOT ASSIGNED		
R42	SAME AS R1, 10KΩ		
R43	SAME AS R18, 6.8KΩ		
R44	SAME AS R39, 2.2KΩ		
R45	SAME AS R18, 6.8KΩ		
R46	RESISTOR, 47Ω		RCR07G470KS
R47	SAME AS R15, 180Ω		
R48, R49	SAME AS R16, 100Ω		
R50	SAME AS R4, 680Ω		
R51	RESISTOR, 10KΩ		RCR07G472KS
R52	RESISTOR, 1KΩ/1W W.W.		RW70V1001F
R53	RESISTOR, 560Ω/1W W.W.		RW70V5600F
R54	SAME AS R16, 100Ω		
R55	SAME AS R3, 220Ω		
R56, R57	SAME AS R1, 10KΩ		
Z1	TUNED CIRCUIT 2-4MHz	P&B	03-13476-1
Z1C1	CAPACITOR, 1-75 pF		PC39J750
Z1C2	CAPACITOR, 0.01 μF		CK06VX103M
Z1C3	SAME AS Z1C1, 1-75 pF		
Z1C4	SAME AS Z1C2, 0.01 μF		
Z1L1, Z1L2	COIL	P&B	21-37261-1
Z2	TUNED CIRCUIT 4-8MHz	P&B	03-13476-2
Z2C1	CAPACITOR, 1-75 pF		PC39J750
Z2C2	CAPACITOR, 0.01 μF		CK06VX103M
Z2C3	SAME AS Z2C1, 1-75 pF		
Z2C4	SAME AS Z2C2, 1-75 pF		
Z2L1, Z2L2	COIL	P&B	21-37262-1

TABLE 5-25 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
Z3	TUNED CIRCUIT 8-16 MHz	P&B	03-13476-2
Z3C1	CAPACITOR, 1-75 pF		PC39J750
Z3C2	CAPACITOR, 0.01 μF		CK06VX103M
Z3C3	SAME AS Z3C1, 1-75 pF		
Z3C4	SAME AS Z3C2, 1-75 pF		
Z3L1, Z3L2	COIL	P&B	21-3726B-1
Z4	TUNED CIRCUIT 16-30MHz	P&B	03-13476-4
Z4C1	CAPACITOR, 1-75 pF		PC39J750
Z4C2	CAPACITOR, 0.01 μF		CK06VX103M
Z4C3	SAME AS Z4C1, 1-75 pF		
Z4C4	SAME AS Z4C2, 1-75 pF		
Z4L1, Z4L2	COIL	P&B	21-37261-1

TABLE 5-26

FIRST HF CONVERTER (PC-181)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
A1	MIXER, 1.6 MHz	P&B	03-3404-2
A10CR1-CR4	DIODE		JAN 1N914
A10MP1	HEADER		2501
A10MP2	SHELL		2001
A10MP3	BOARD	P&B	03-13752-1
A10MP4	BOARD	P&B	03-13752-2
A10T1	TRANSFORMER	P&B	21-37259-1
A10T2	TRANSFORMER	P&B	21-37260-1
C1, C2	CAPACITOR, 0.01 μF		CK06CW103M
C3-C6	CAPACITOR, 8-50 pF	ERI	
C7	CAPACITOR, 100 pF		CM05FD101JP3
C8	CAPACITOR, 390 pF		CM05FD391JP3
C9	SAME AS C1, 0.01 μF		
C10	CAPACITOR, 1000 pF		CM06FD102JP3
C11-21	SAME AS C1, 0.01 μF		
C22	CAPACITOR, 1-28 pF		PC43J360.990
C23	CAPACITOR, 120 pF		CM05FD121JP3
C24	CAPACITOR, 1500 pF		CM06FD152JP3
C25, C26, C27	SAME AS C1, 0.01 μF		
C28	CAPACITOR, 130 pF		CM05FD131JP3
C29	CAPACITOR, 9-35 pF	ERI	538-011-94D
C30, C31, C32	SAME AS C1, 0.01 μF		
C33	NOT ASSIGNED		
C34	SAME AS C8, 390 pF		
C35	CAPACITOR, 470 pF		CM06FD471JP3
CR1-CR6	DIODE		1N914A
CR7, CR8	DIODE		JAN 1N953
L1	CHOKE, 27 μH	NYT	MS9053-30(SWD-27)
L2, L3	CHOKE	P&B	21-37258-1
MP1	BOARD, P.C.	P&B	
MP2	PAD, TRANSISTOR	MRO	10117
Q1	TRANSISTOR		JAN 2N2369A
Q2-Q8	TRANSISTOR		JAN 2N2222
R1, R2	RESISTOR, 10KΩ		RCR07G103KS
R3	RESISTOR, 47KΩ		RCR07G473KS
R4	RESISTOR, 4.7KΩ		RCR07G472KS
R5	SAME AS R3, 47KΩ		
R6-R9	SAME AS R1, 10KΩ		
R10	RESISTOR, 680Ω		RCR07G681KS
R11	RESISTOR, 220Ω		RCR07G221KS
R12	RESISTOR, 22Ω		RCR07G220KS
R13	SAME AS R1, 10KΩ		
R14	SAME AS R4, 4.7KΩ		

TABLE 5-26 (Continued)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	VENDOR	PART NO.
R15, R16	RESISTOR, 100Ω		RCR07G101KS
R17	RESISTOR, 470Ω		RCR07G471KS
R18	RESISTOR, 2.2KΩ		RCR07G222KS
R19	SAME AS R3, 47KΩ		
R20	SAME AS R1, 10KΩ		
R21, R22	SAME AS R15, 100Ω		
R23	SAME AS R3, 47KΩ		
R24	SAME AS R1, 10KΩ		
R25	SAME AS R15, 100Ω		
R26	RESISTOR, 6.8KΩ		RCR07G682KS
R27	SAME AS R15, 100Ω		
R28	RESISTOR, 1.2KΩ		RCR07G122KS
R29, R30	RESISTOR, 1K/1W W.W.		RW70V1001F
R31	SAME AS R26, 6.8KΩ		
R32	SAME AS R4, 4.7KΩ		
R33	RESISTOR, 47Ω		RCR07G470KS
R34	RESISTOR, 330Ω		RCR07G331KS
R35	SAME AS R4, 4.7KΩ		
R36	RESISTOR, 15KΩ		RCR07G153KS
R37	SAME AS R15, 100Ω		
R38	SAME AS R36, 15KΩ		
R39	SAME AS R4, 4.7KΩ		
R40	SAME AS R33, 47Ω		
R41	SAME AS R11, 220Ω		
R42	SAME AS R26, 6.8KΩ		
R43	SAME AS R4, 4.7KΩ		
R44	SAME AS R15, 100Ω		
R45	SAME AS R1, 10KΩ		
R46	SAME AS R15, 100Ω		
XY1-XY4	SOCKET, CRYSTAL	AUG	8004-1G23.5
Y1	CRYSTAL, F_0 + 1.6 MHz	P&B	20-37207-*
Y2	CRYSTAL, F_0 + 1.6 MHz	P&B	20-37207-*
Y3	CRYSTAL, F_0 + 1.6 MHz	P&B	20-37207-*
Y4	CRYSTAL, F_0 + 1.6 MHz	P&B	20-37207-*

SECTION 6

SCHEMATIC DIAGRAMS

6-1 GENERAL

This section is composed of a complete schematic set of the radio set. The last pages of the section are the large fold-out schematics of the system's major assemblies. These drawings are located so as to facilitate signal tracing.

6-2 CROSS-REFERENCE TABLES

Tables 6-1 and 6-2 are included as aids in locating specific schematics.

- PC BOARD CROSS REFERENCE

The printed circuit boards are listed by PC Number in Table 6-1 along with the schematic figure number.

- PICKARD & BURNS DRAWING NUMBER

Many schematics refer to other schematics only by Pickard & Burns Part Number. Table 6-2 lists all schematics by Pickard & Burns Number and include title, PC Number, and figure and page numbers.

6-3 NOTES

On all schematics the following notes apply unless otherwise specified:

All capacitance values are in microfarads.
All resistances are in ohms.
All resistors are 1/4 watt at 10%.
All transistors are JAN 2N2222.
All diodes are JAN 1N914.

TABLE 6-1

PC BOARD CROSS REFERENCE CHART

PC NUMBER	TITLE	SCHEMATIC FIGURE
181	FIRST HF CONVERTER	6-1
182	SECOND HF CONVERTER	6-2
183	UHF POWER AMPLIFIER	6-3
184	UHF DISTRIBUTION BOARD TYPE NO. 2	6-4
185	UHF MODULATOR	6-5
187	HF RECEIVER/EXCITER	6-6
188	HF POWER AMPLIFIER	6-7
189	UHF DISTRIBUTION BOARD TYPE NO. 3	6-8
190	UHF EXCITER CHANNEL	6-9
191	IF AMPLIFIER	6-10
259	MICROPHONE/AUDIO AMPLIFIER	6-11
260	SPEAKER/PHONE AMPLIFIER	6-12
263	SUB CARRIER AMPLIFIER	6-13
264	BFO DEMODULATOR	6-14
265	SUB CARRIER AND MODULATOR	6-15
266	SUB CARRIER AMPLIFIER/FILTER	6-16
268	PHONE/REMOTE SPEAKER AMPLIFIERS	6-17
277	UHF RECEIVER CHANNEL	6-18
290	MATCHING NETWORK TYPE 1 AND 2	6-19
291	MATCHING NETWORK TYPE 3	6-20
292	MATCHING NETWORK TYPE 4	6-21
293	MATCHING NETWORK TYPE 5	6-22
294	MATCHING NETWORK TYPE 6 AND 7	6-23
297	UHF DISTRIBUTION BOARD TYPE 1	6-27
	OUTBOARD	
101	LOGIC STORAGE AND READ IN	6-38
103	POWER SWITCHING	6-35
104	TIMING, SYNC, REGULATION AND LINE DRIVERS	6-36
	IN BOARD	
1	STORAGE FORMAT AND CLOCK	6-31
2	SYNC AND SWITCHING	6-30
3	RC TRIGGER CARD	6-32
	INTERFACE CARD	6-29
	IFF CONTROL	
1	RC TRIGGER	6-28
2	IFF INTERROGATE	6-33

TABLE 6-2

PICKARD & BURNS DRAWING NUMBER INDEX

P&B DRAWING NUMBER	TITLE	FIGURE	PAGE
10-3281	PC-181 FIRST HF CONVERTER	6-1	6-4
10-3282	PC-182 SECOND HF CONVERTER	6-2	6-5
	BLOCK DIAGRAM OF 5-WATT AM MODULATOR	6-3	6-6
10-3284	PC-184 UHF DISTRIBUTION BOARD TYPE NO. 2	6-4	6-7
10-3285	PC-185 UHF MODULATOR	6-5	6-8
10-3287	PC-187 HF RECEIVER/EXCITER	6-6	6-9
10-3288	PC-188 HF POWER AMPLIFIER	6-7	6-10
10-3289	PC-189 UHF DISTRIBUTION BOARD TYPE NO. 3	6-8	6-11
10-3290	PC-190 UHF EXCITER CHANNEL	6-9	6-12
10-3291	PC-191 IF AMPLIFIER	6-10	6-13
10-3307	PC-259 MICROPHONE/AUDIO AMPLIFIER	6-11	6-14
10-3308	PC-260 SPEAKER/PHONE AMPLIFIER	6-12	6-15
10-3311	PC-263 SUB CARRIER AMPLIFIER	6-13	6-16
10-3312	PC-264 BFO DEMODULATOR	6-14	6-17
10-3313	PC-265 SUB CARRIER AND MODULATORS	6-15	6-18
10-3314	PC-266 SUB CARRIER AMPLIFIER/FILTER	6-16	6-19
10-3316	PC-268 PHONE/REMOTE SPEAKER AMPLIFIERS	6-17	6-20
10-3376	PC-277 UHF RECEIVER CHANNEL	6-18	6-21
10-3729	PC-290 MATCHING NETWORK TYPE 1 AND 2	6-19	6-22
10-3730	PC-291 MATCHING NETWORK TYPE 3	6-20	6-23
10-3731	PC-292 MATCHING NETWORK TYPE 4	6-21	6-24
10-3732	PC-293 MATCHING NETWORK TYPE 5	6-22	6-25
10-3733	PC-294 MATCHING NETWORK TYPE 6 AND 7	6-23	6-26

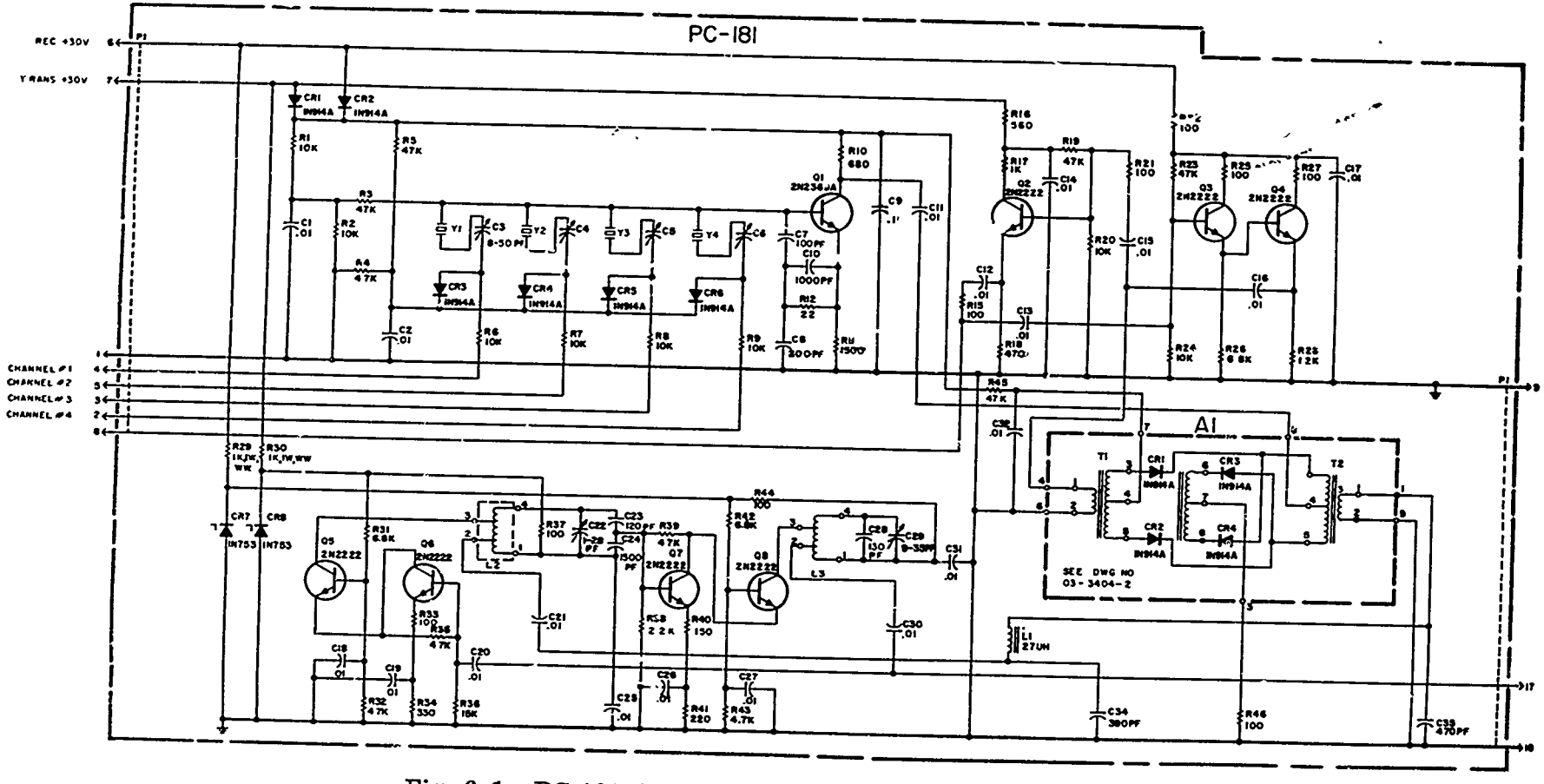

Fig. 6-1. PC 181 (P&B Dwg No. 10-3281) first HF converter

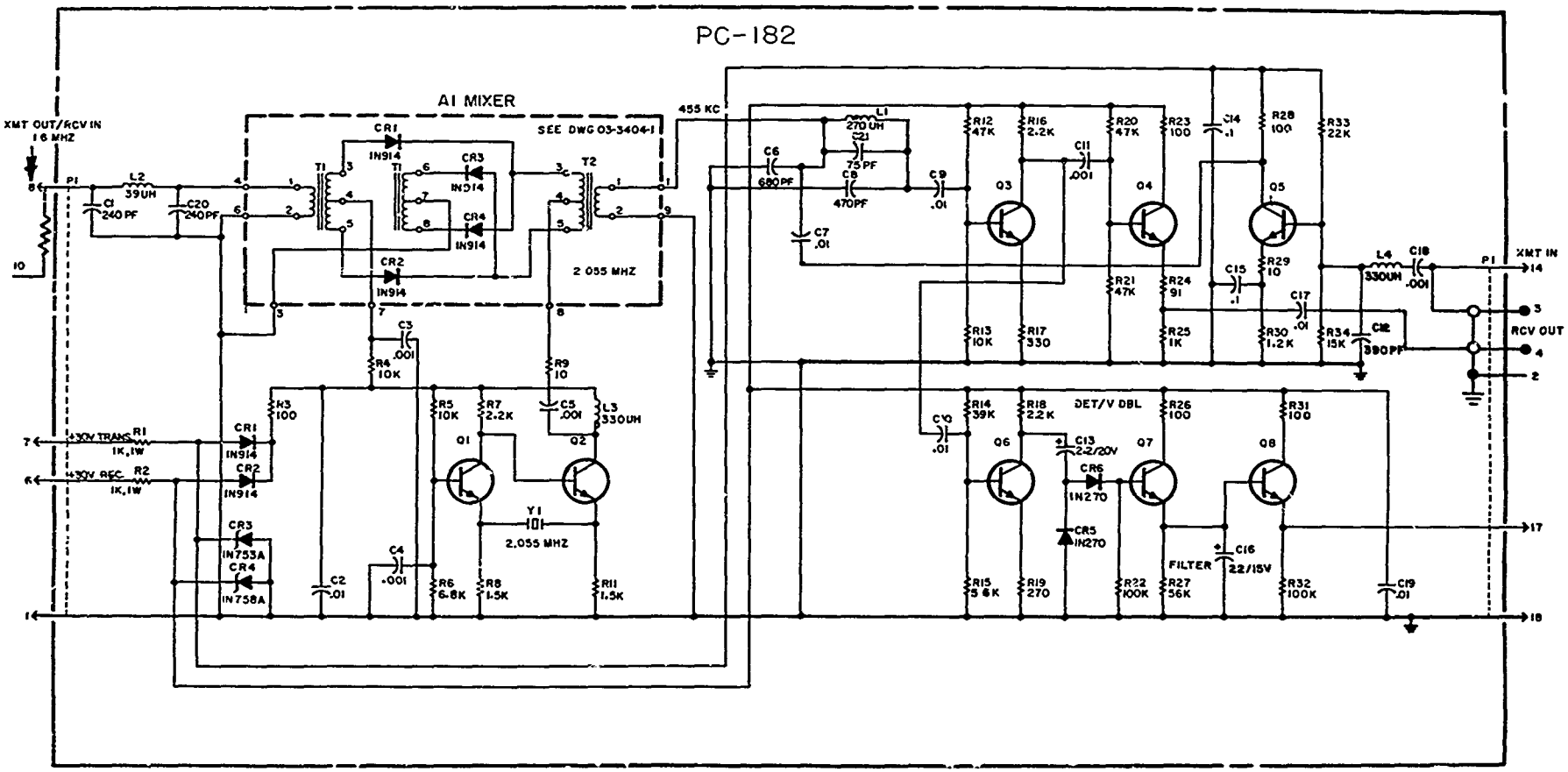

Fig. 6-2. PC 182 (P&B Dwg No. 10-3282) second HF converter

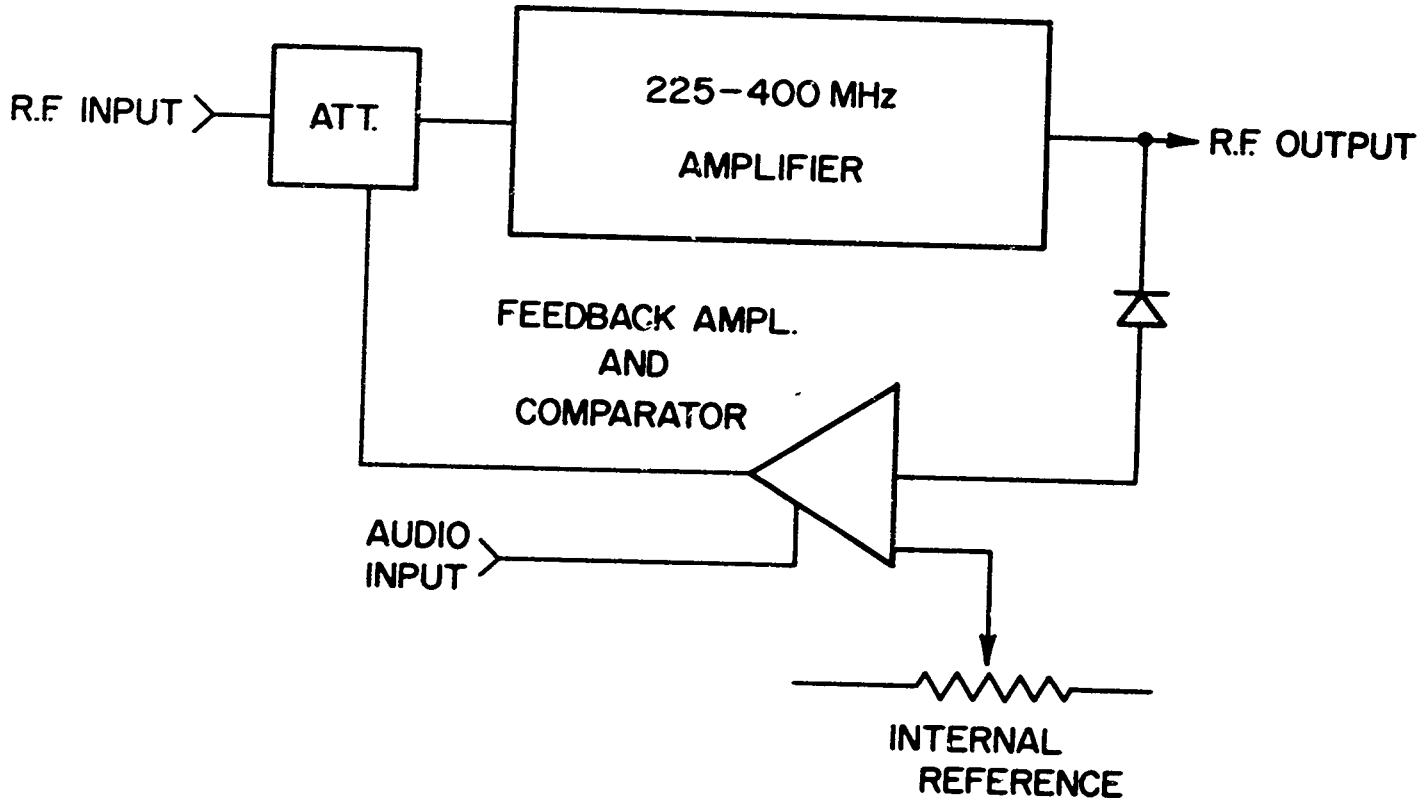

Fig. 6-3. Block diagram of 5-watt AM modulator

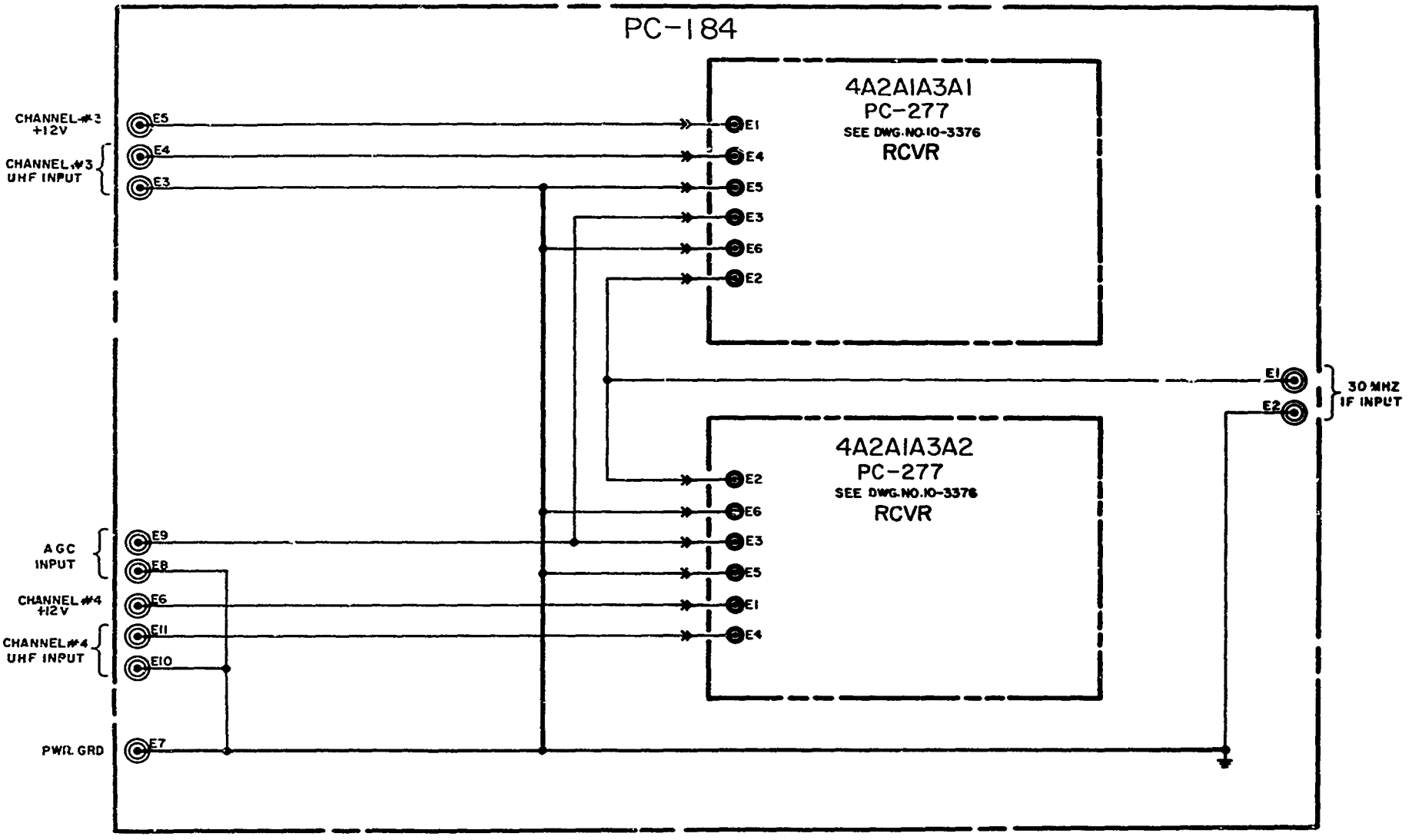

Fig. 6-4. PC 184 (P&B Dwg No. 10-3284) UHF distribution board type 2

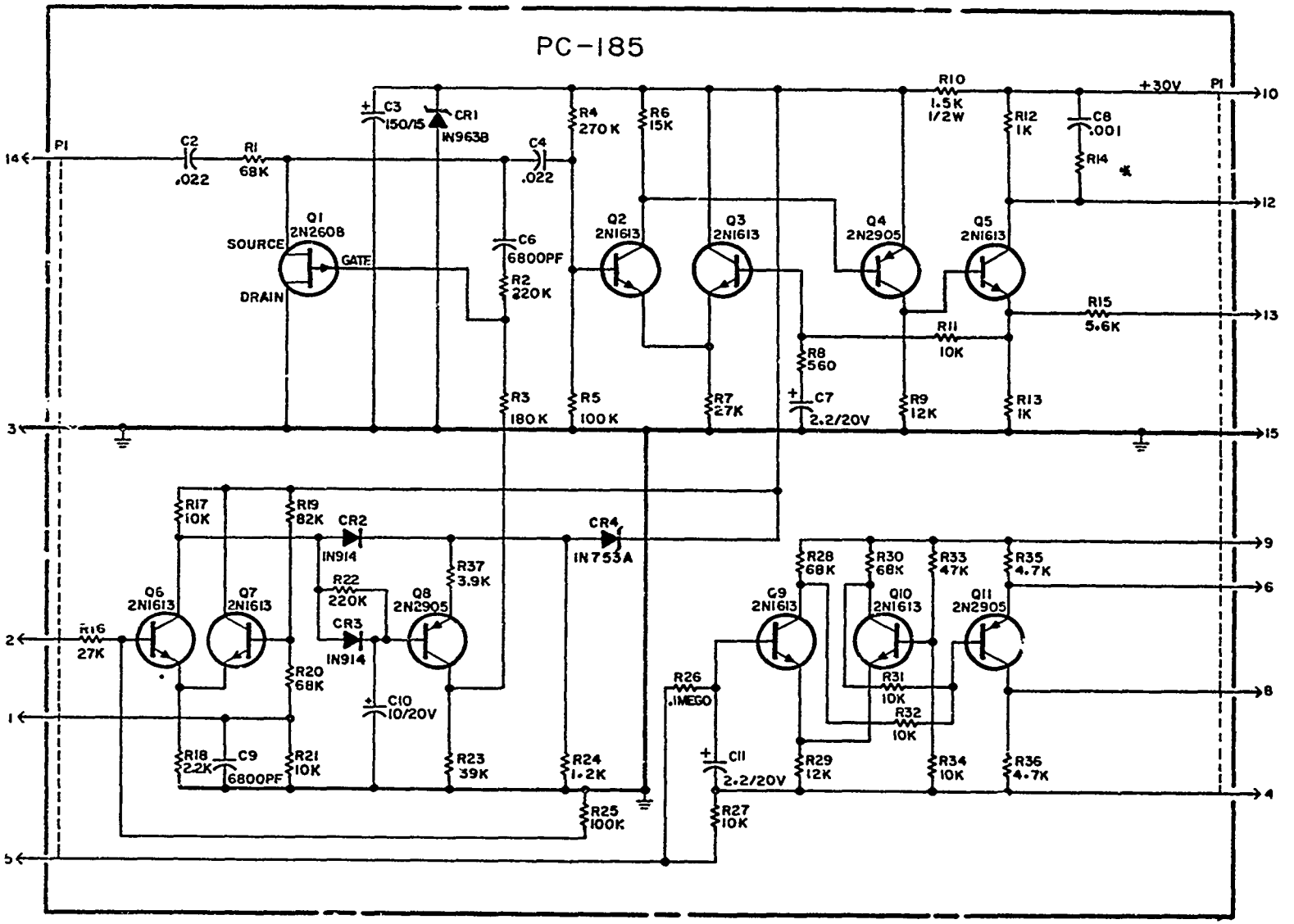

Fig. 6-5. PC 185 (P&B Dwg No. 10-3285) UHF modulator

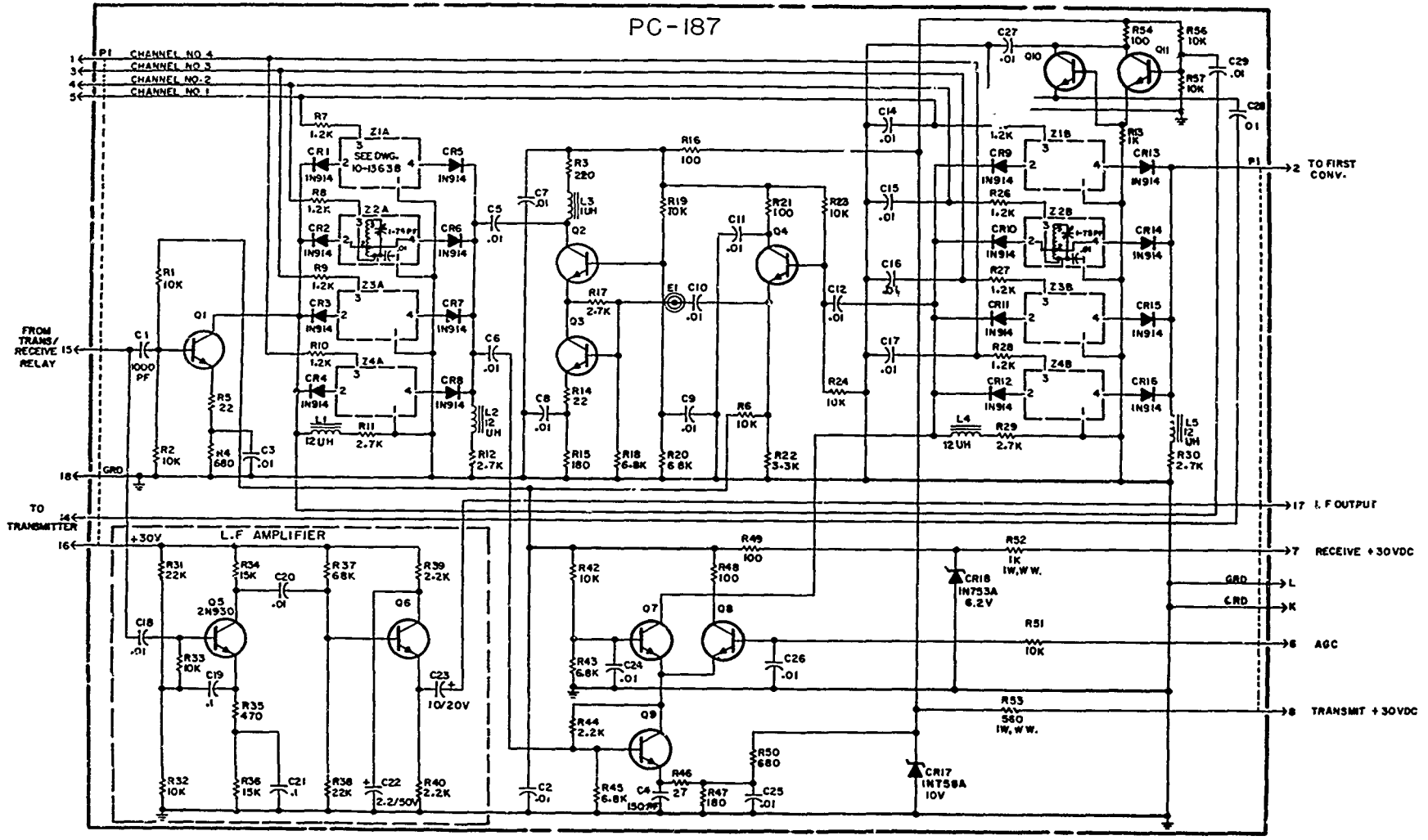

Fig. 6-6. PC 187 (P&B Dwg No. 10-3287) HF receiver/exciter

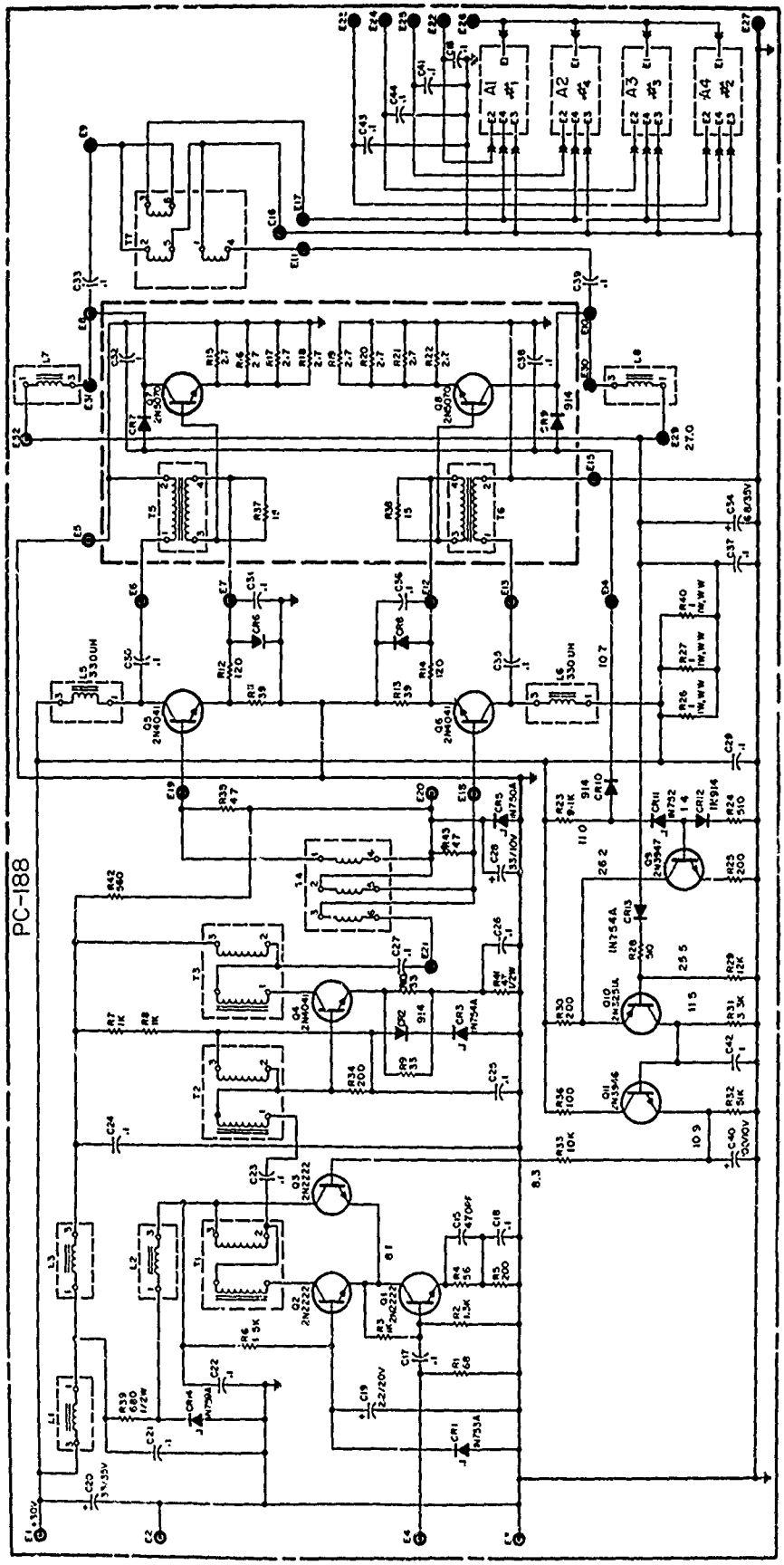

Fig. 6-7. PC 188 (P&B Dwg No. 10-3288) HF power amplifier

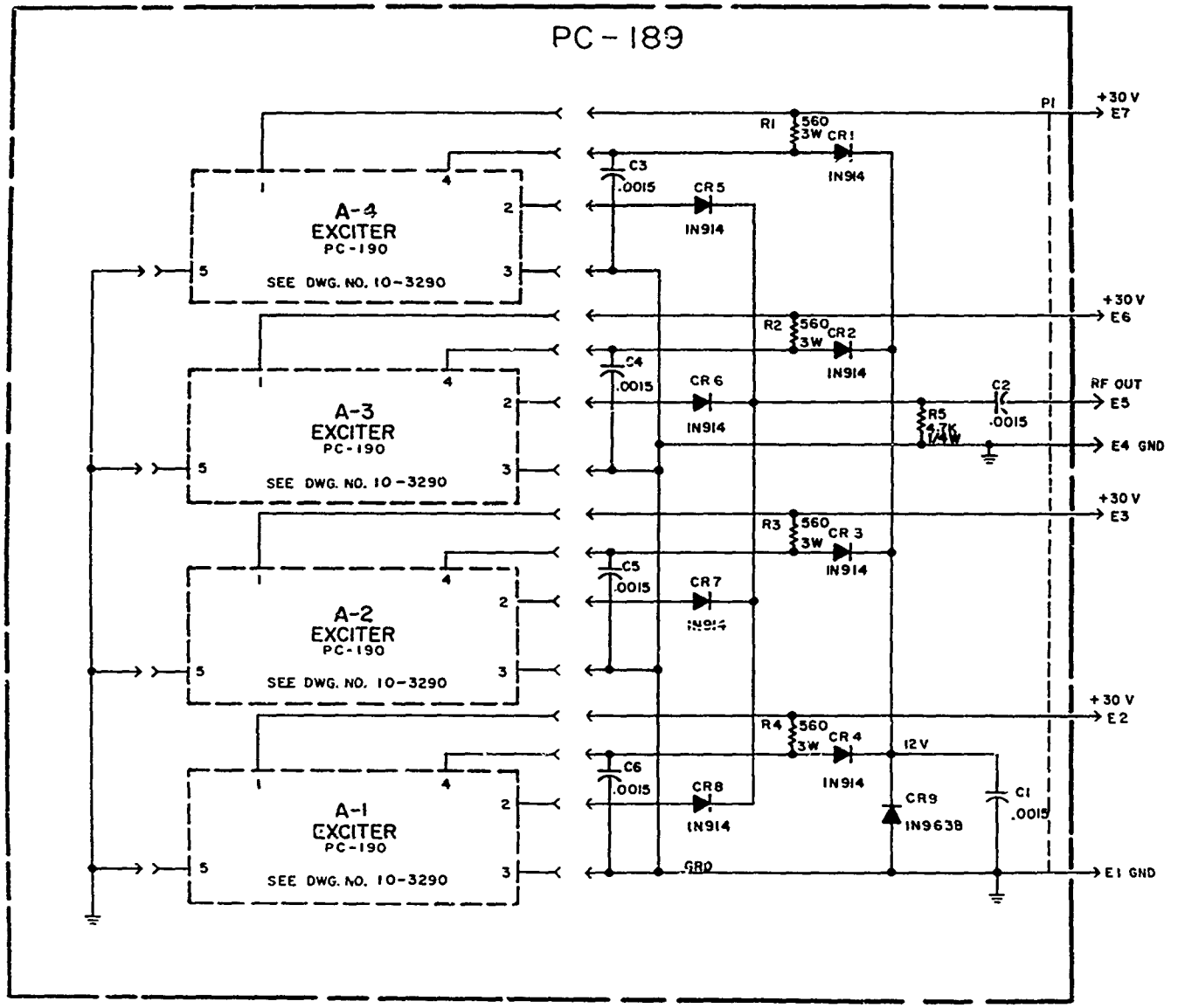

Fig. 6-8. PC 189 (P&B Dwg No. 10-3289) UHF distribution board type 3

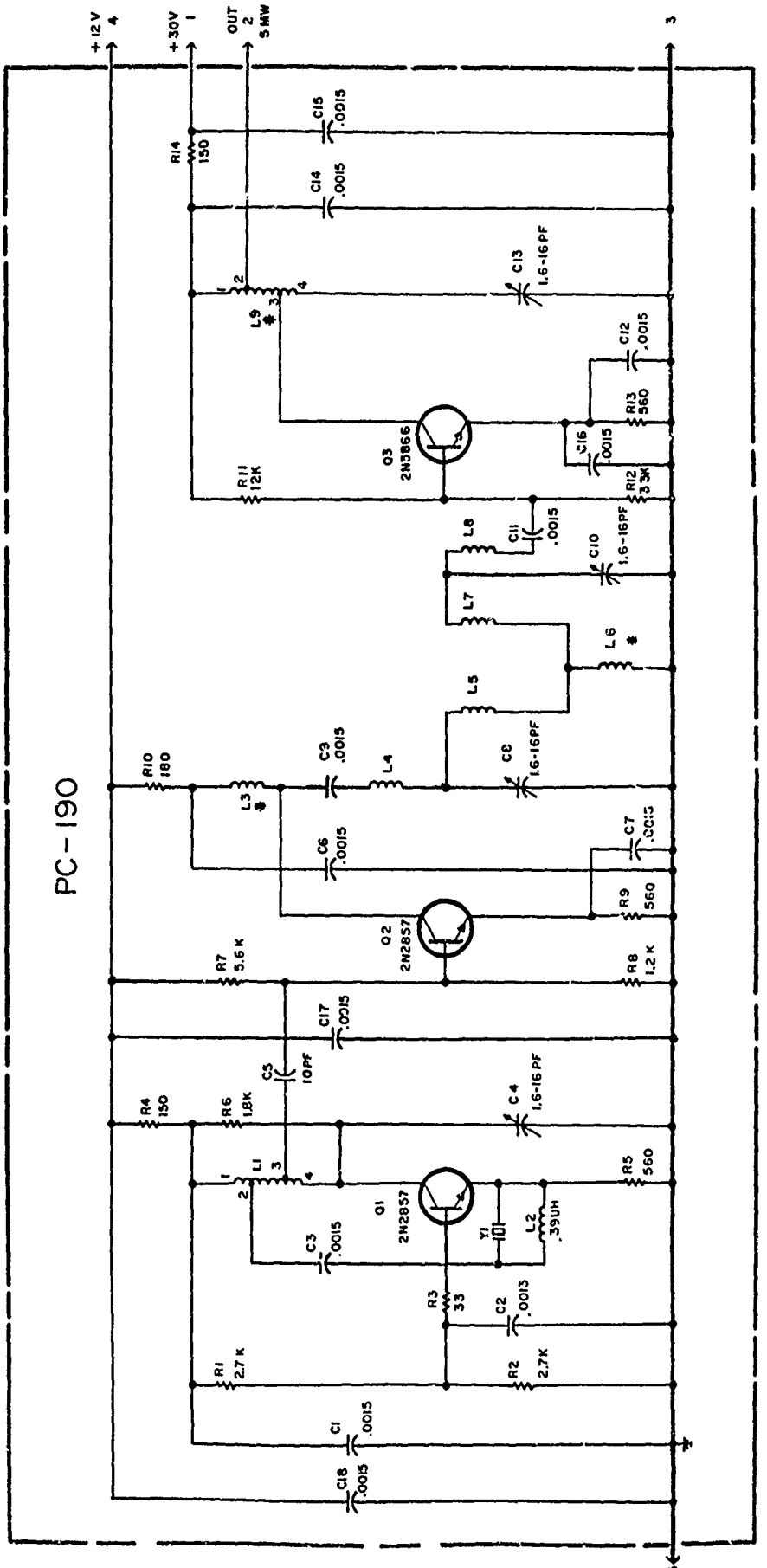

Fig. 6-9. PC 190 (P&B Dwg No. 10-3290) UHF exciter channel

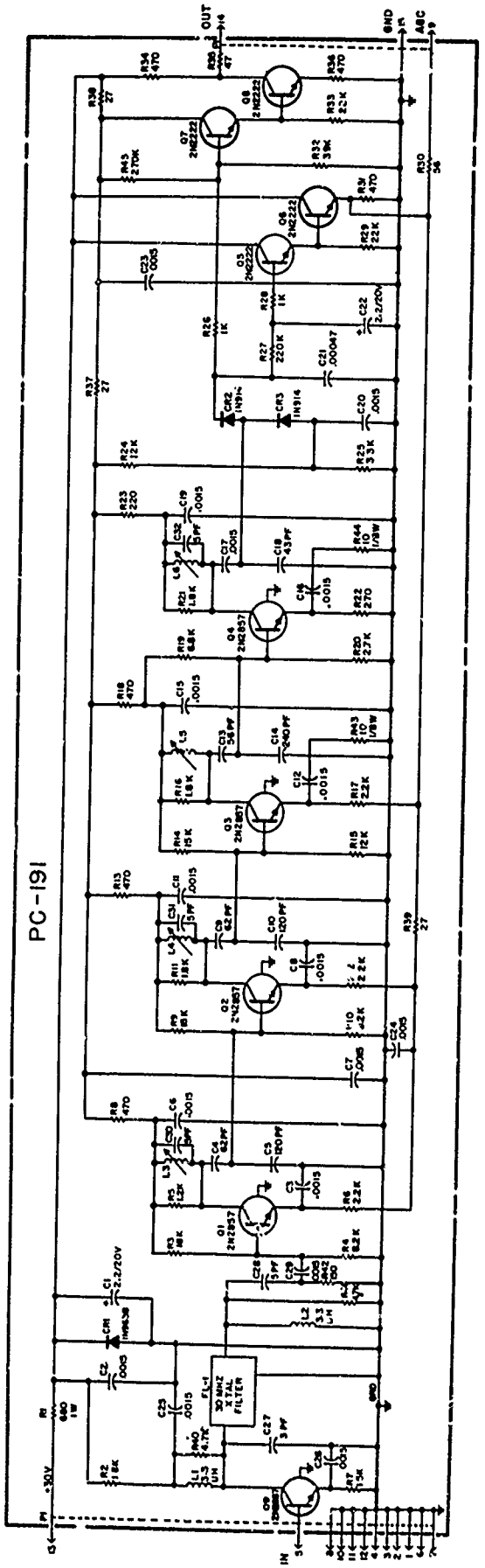

Fig. 6-10. PC 191 (P&B Dwg No. 10-3291) IF amplifier

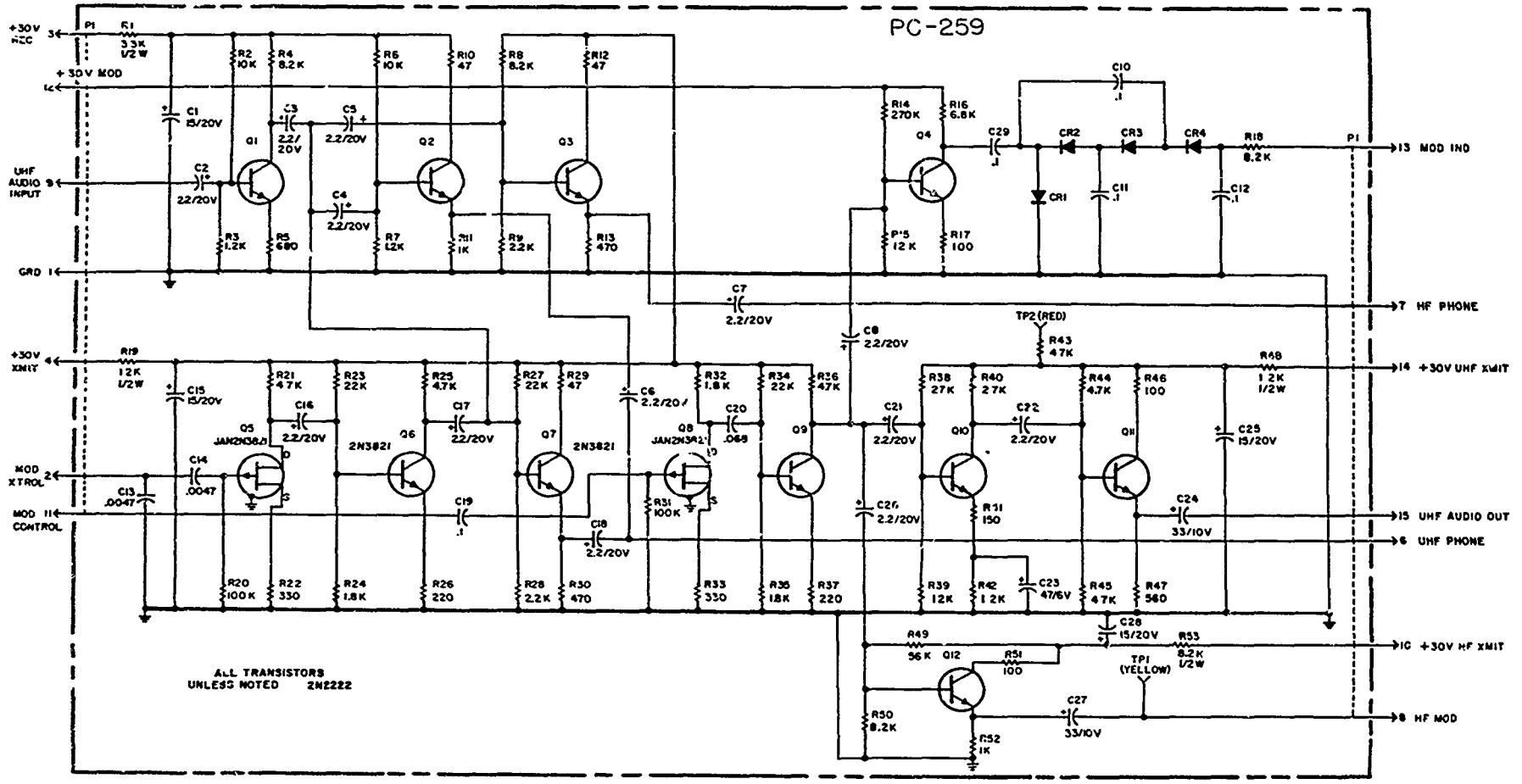

Fig. 6-11. PC 259 (P&B Dwg No. 10-3307) microphone/audio amplifier

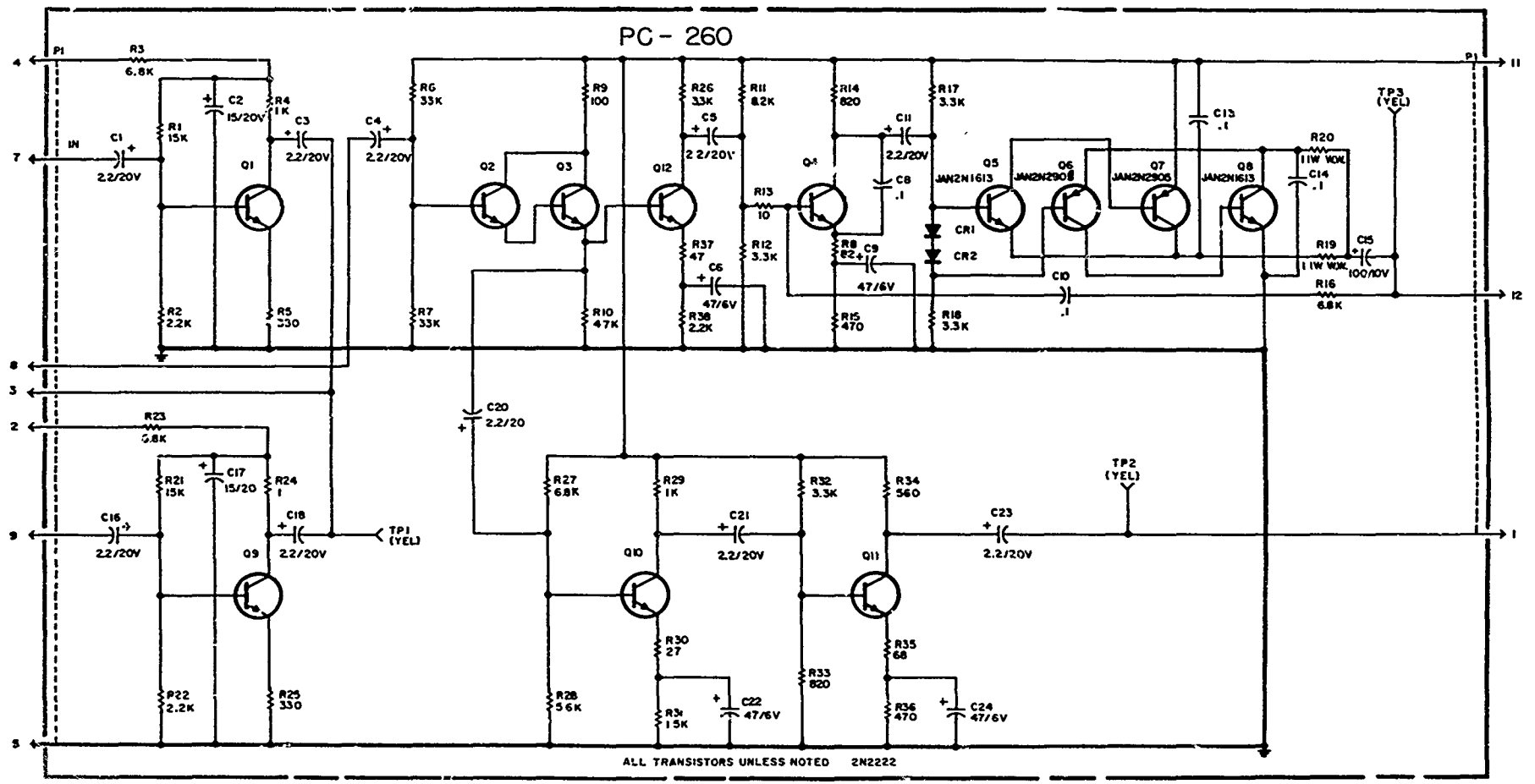

Fig. 6-12. PC 260 (P&B Dwg No. 10-3308) speaker/phone amplifier

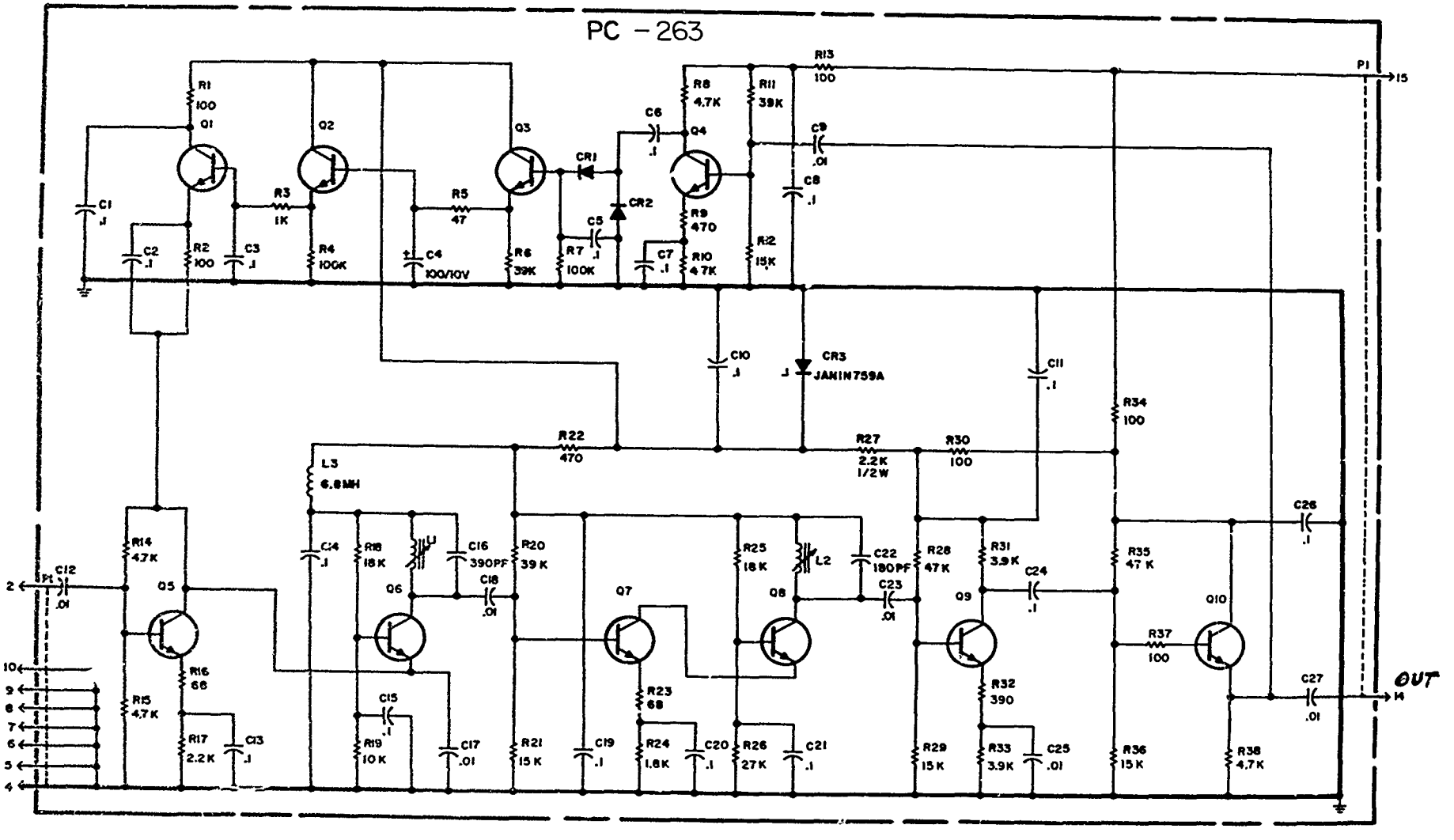

Fig. 6-13. PC 263 (P&B Dwg. No. 10-3311) subcarrier amplifier

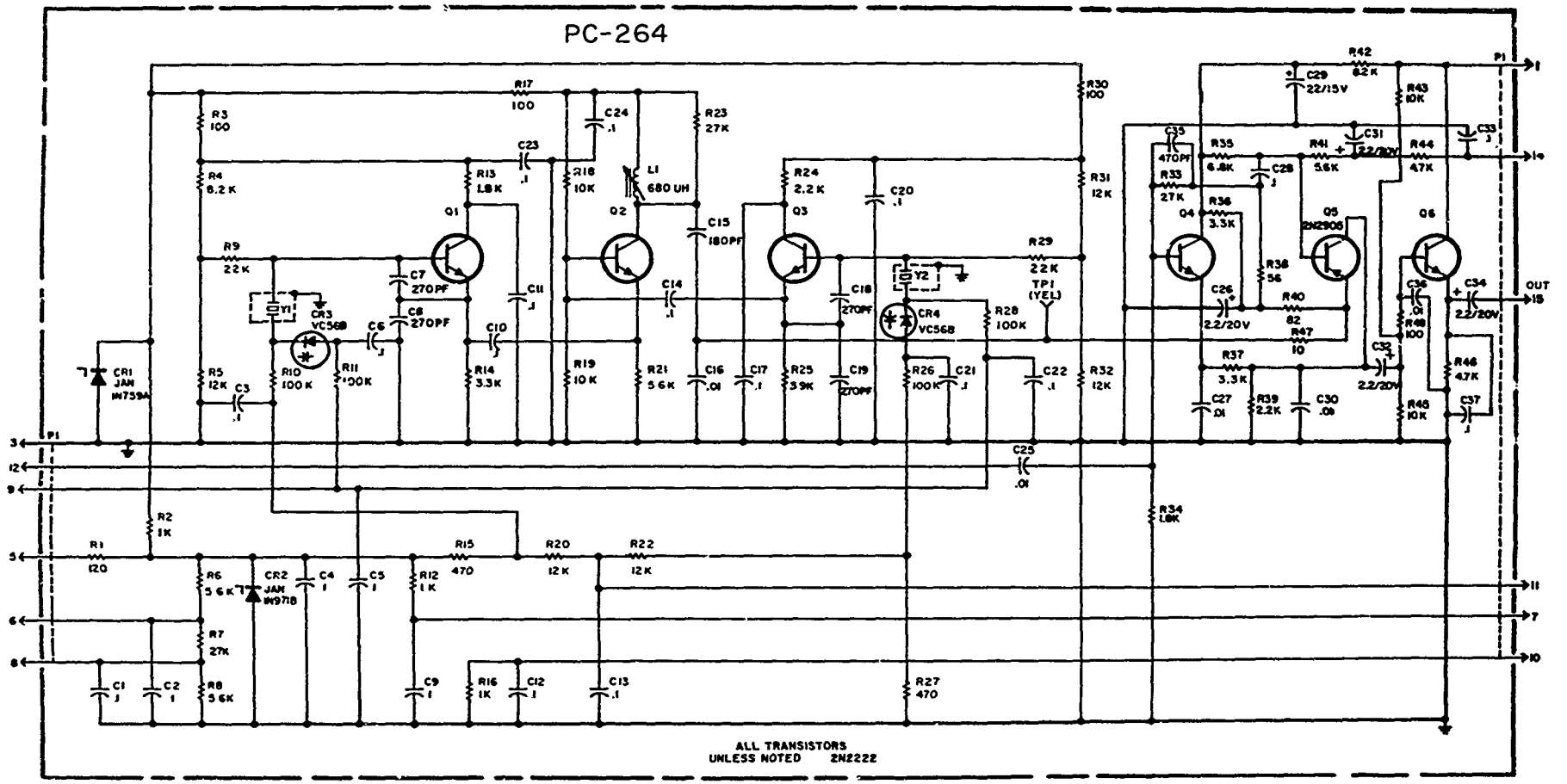

Fig. 6-14. PC 264 (P&B Dwg No. 10-3312) BFO demodulator

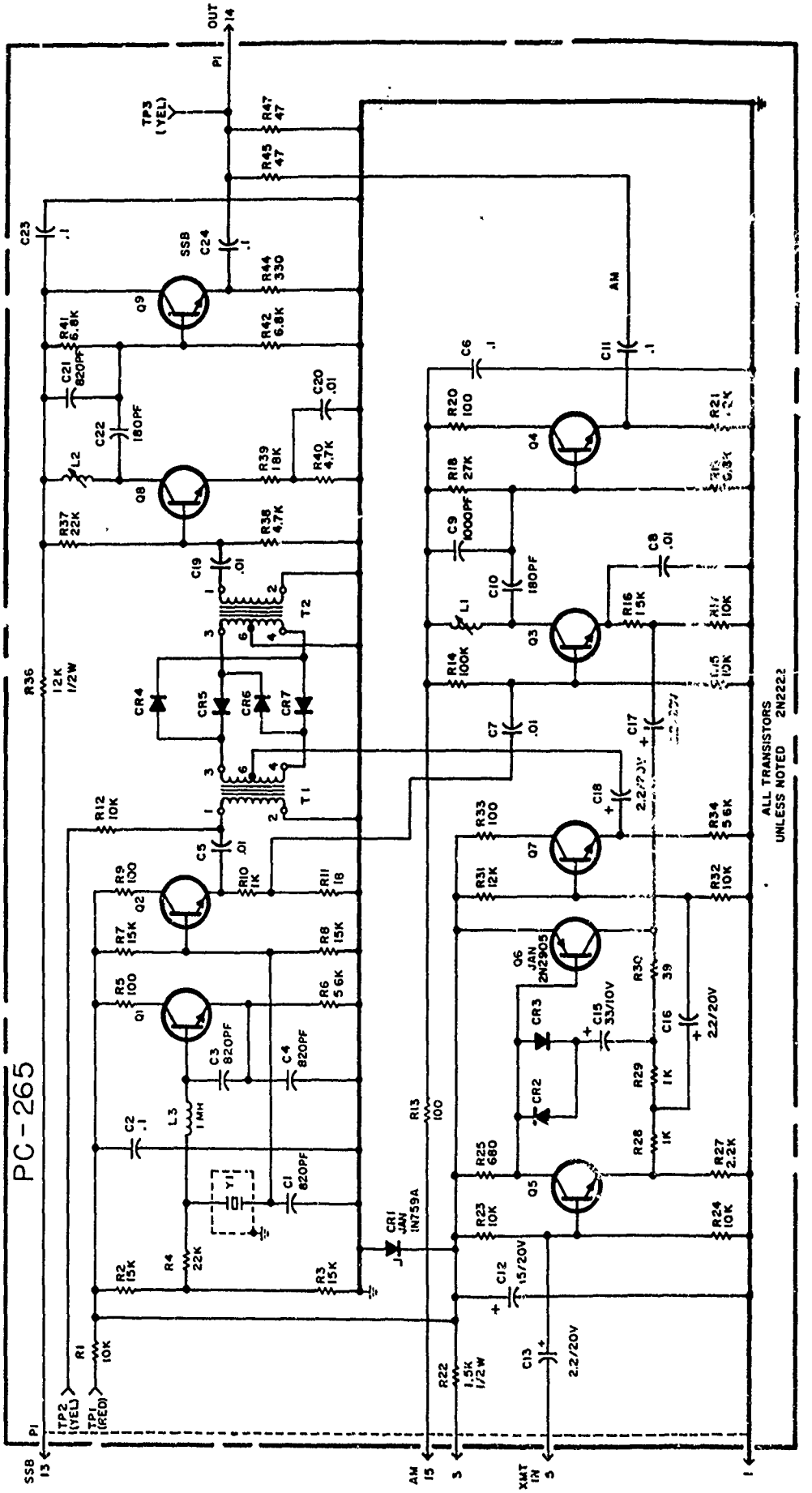

Fig. 6-15. PC 265 (P&B Dwg No. 10-3313) subcarrier and modulators

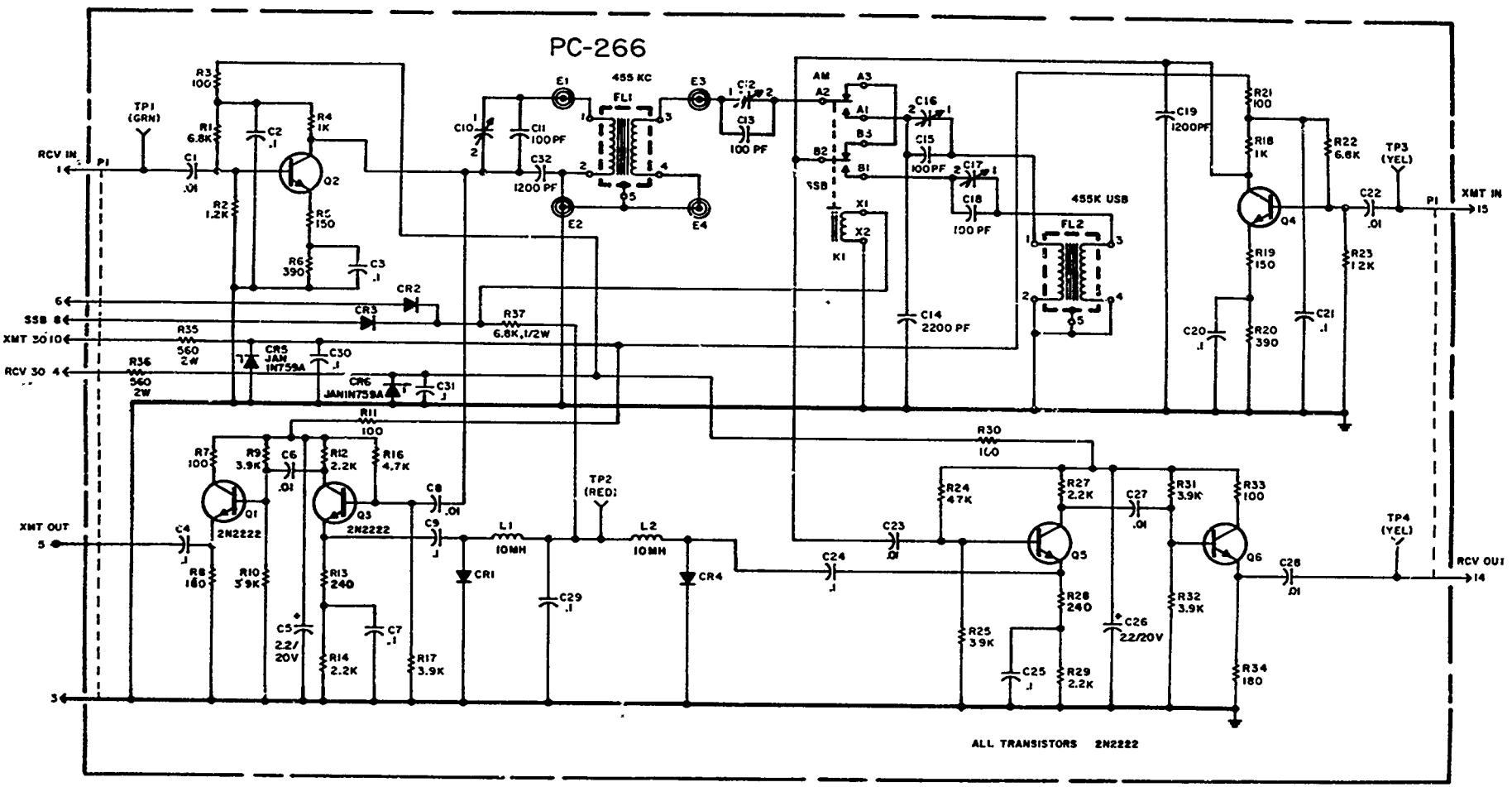

Fig. 6-16. PC 266 (P&B Dwg No. 10-3314) subcarrier amplifier/filter

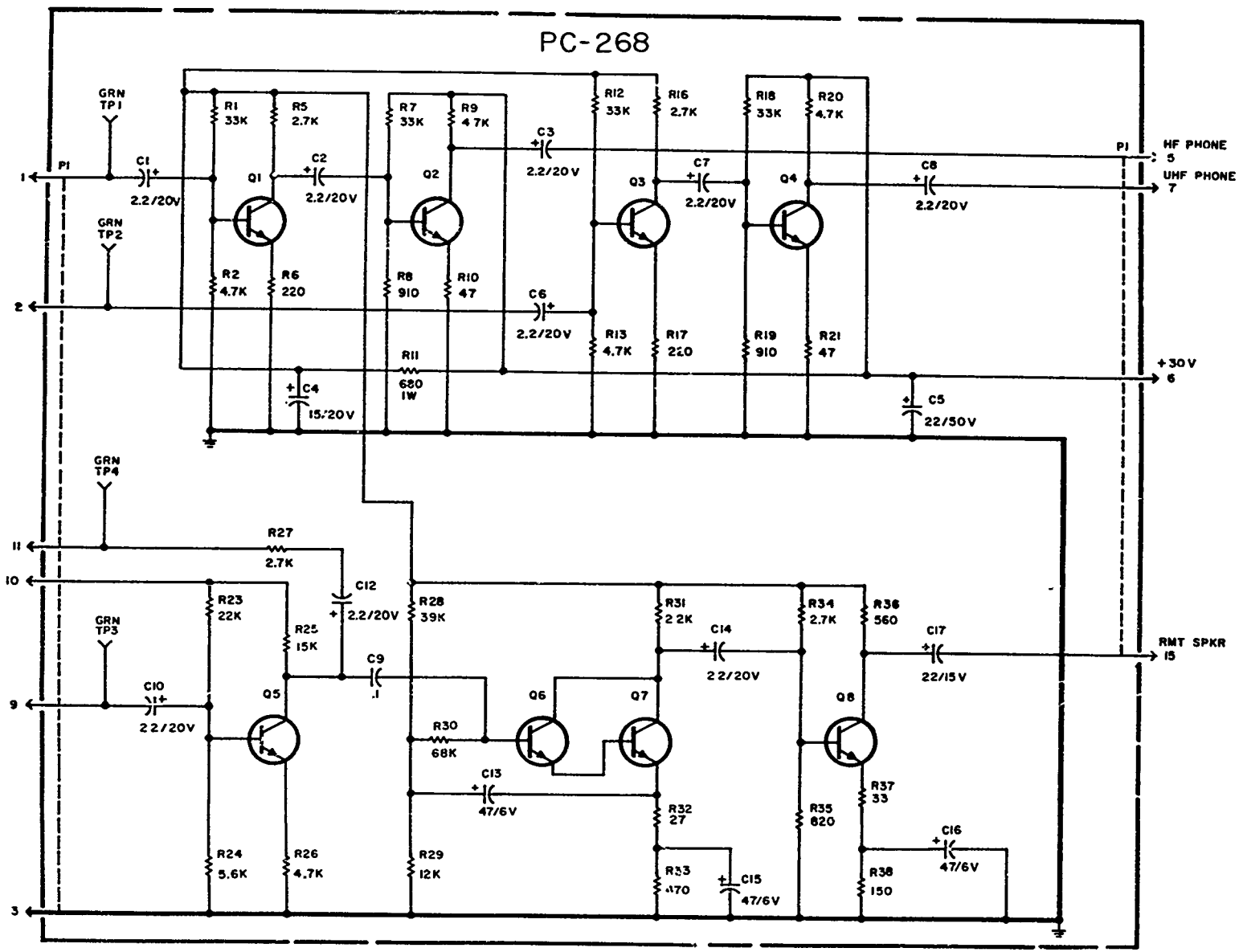

Fig. 6-17. PC 268 (P&B Dwg No. 10-3316) phone/remote speaker amplifiers

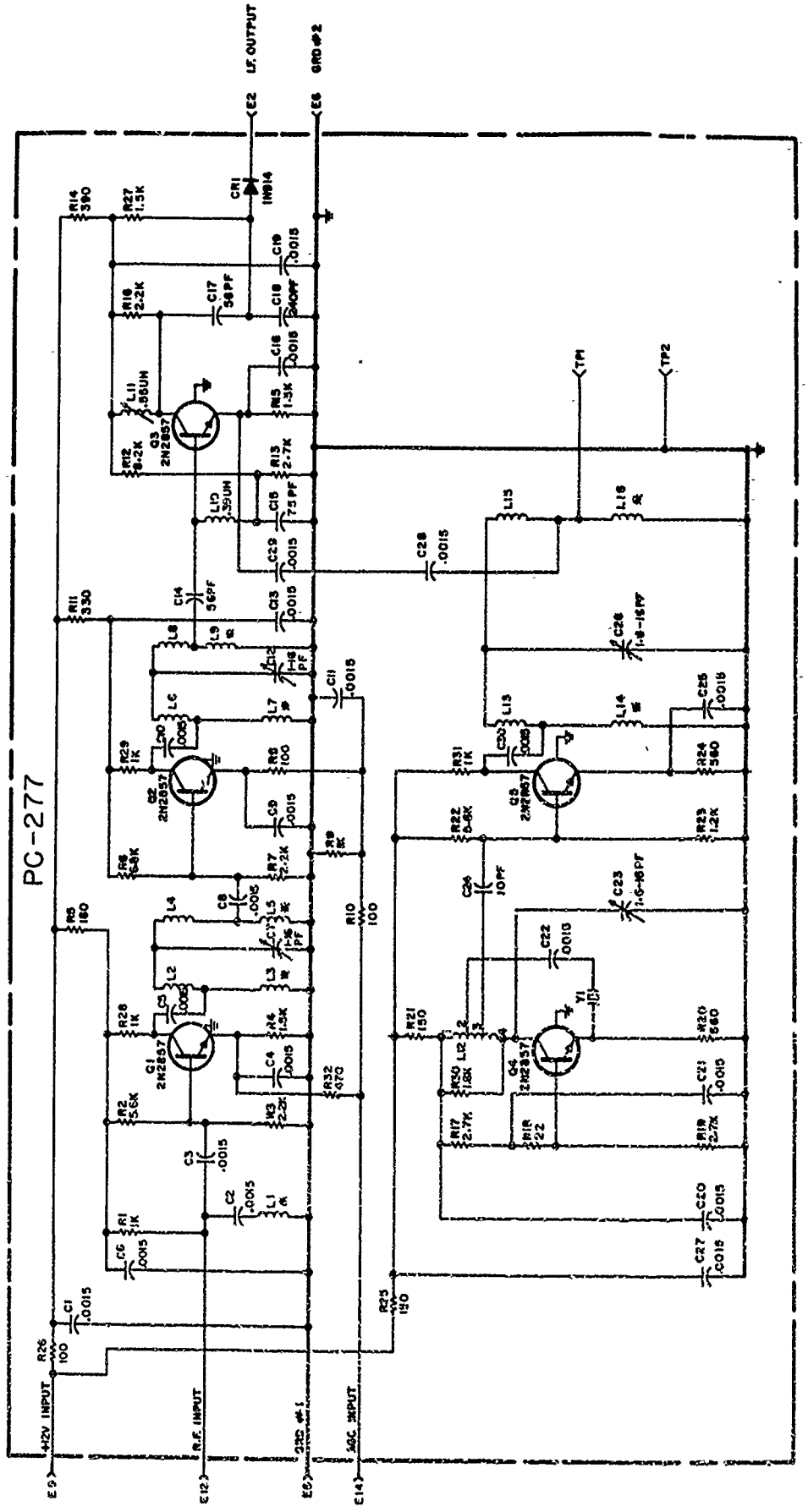

Fig. 6-18. PC 277 (P&B Dwg No. 10-3376) UHF receiver channel

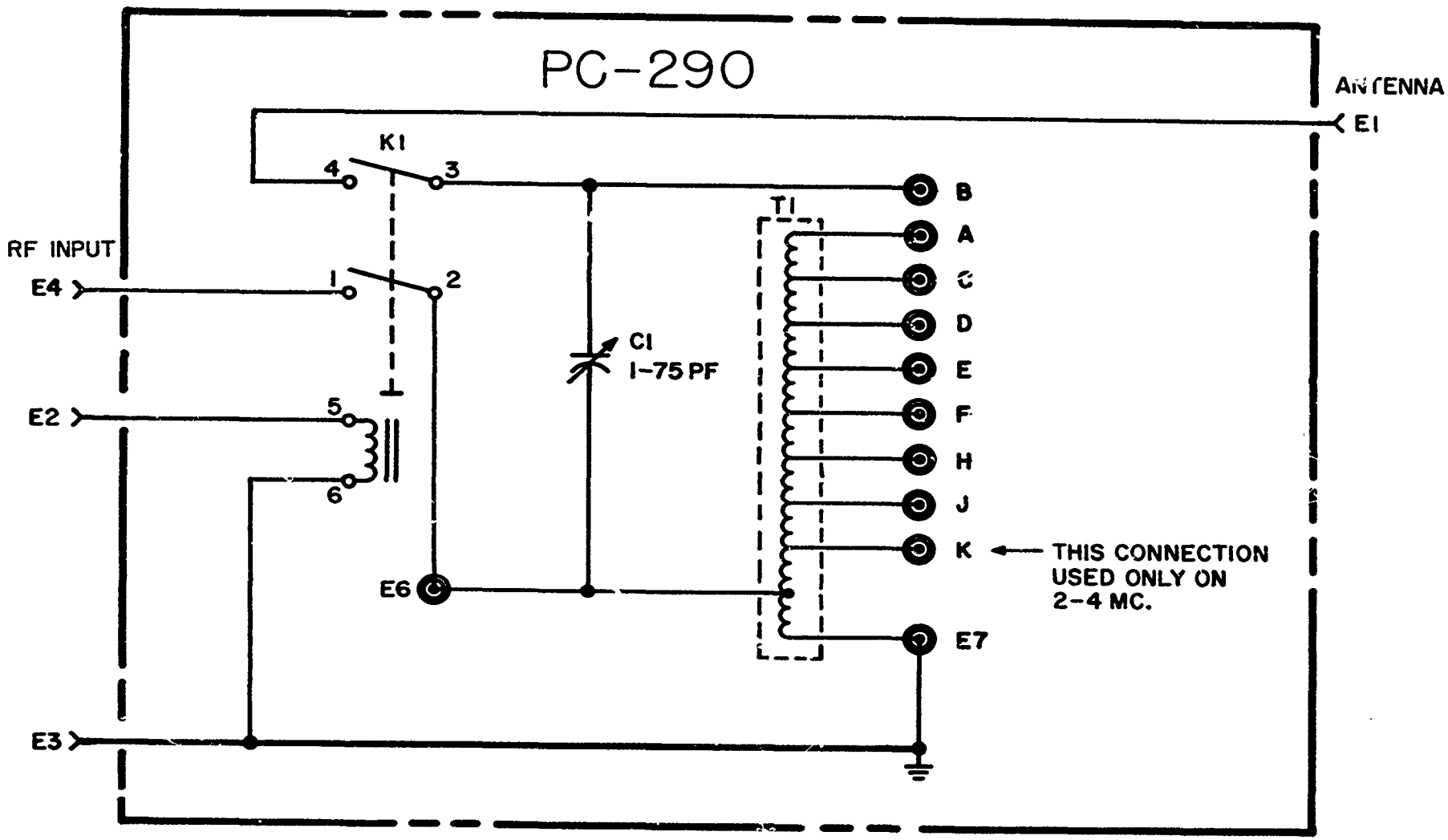

Fig. 6-19. PC 290 (P&B Dwg No. 10-13729) matching networks types 1 and 2

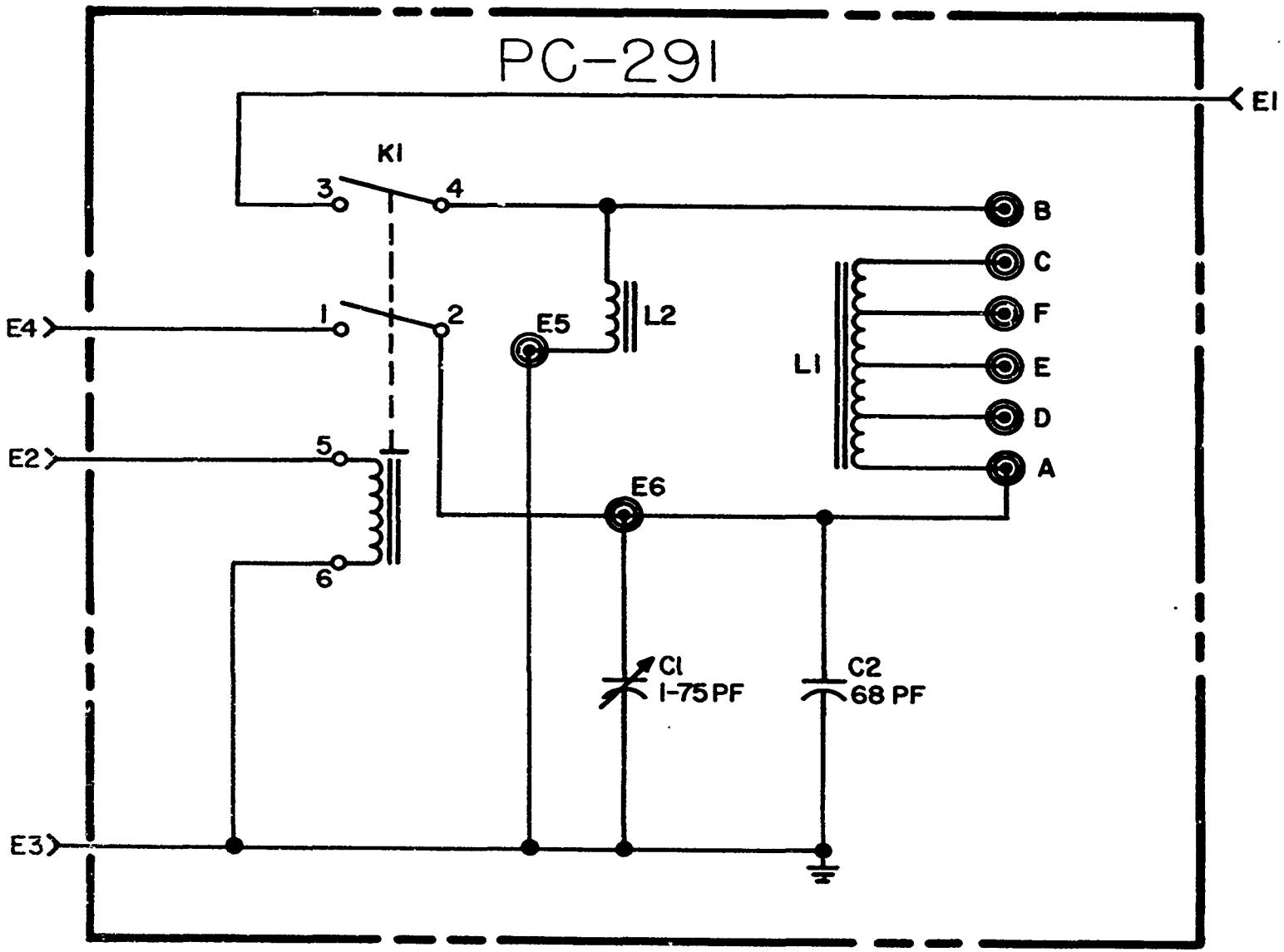

Fig. 6-20. PC 291 (P&B Dwg No. 10-13730) matching network type 3

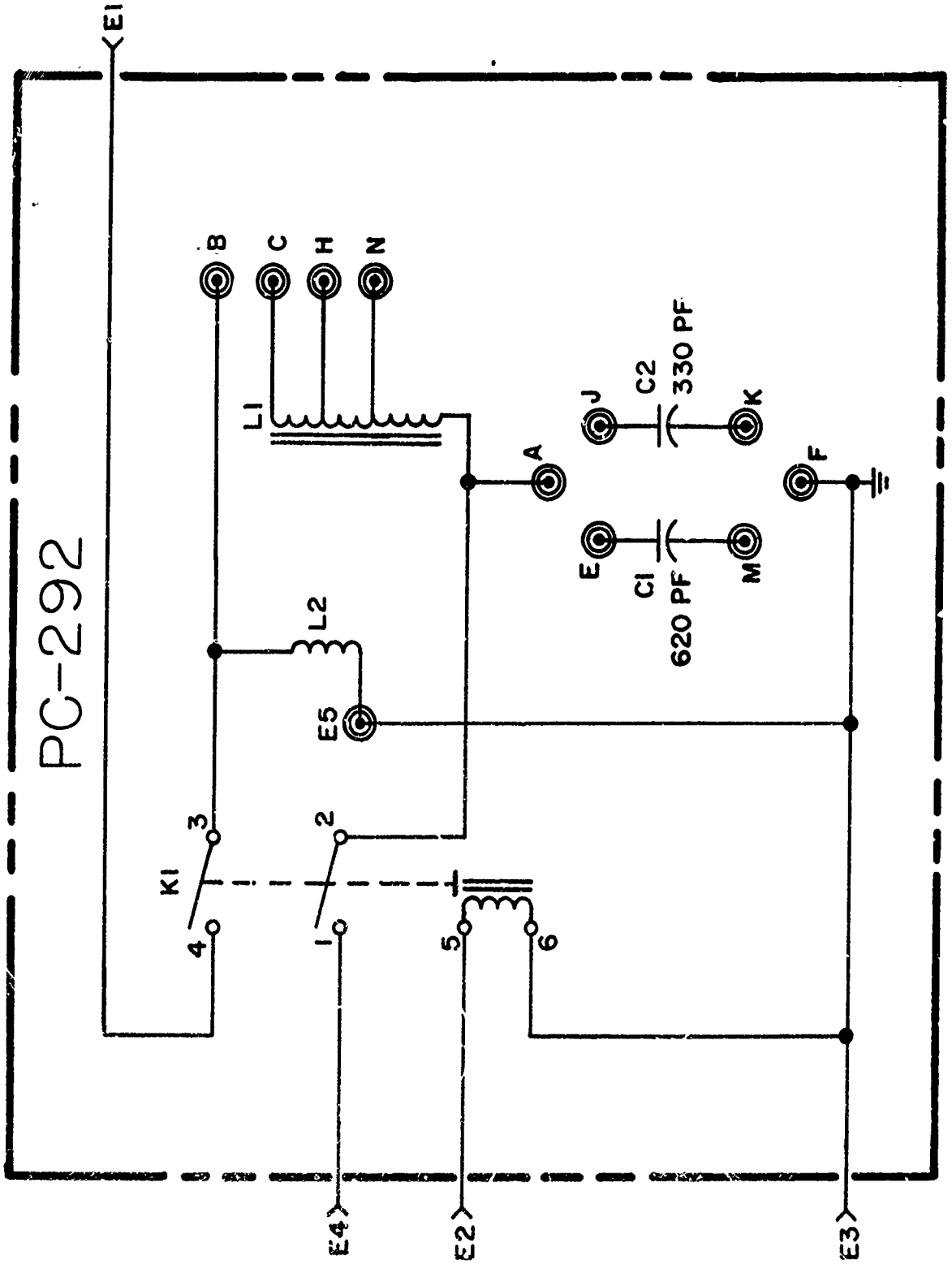

Fig. 6-21. PC 292 (P&B Dwg No. 10-13731) matching network type 4

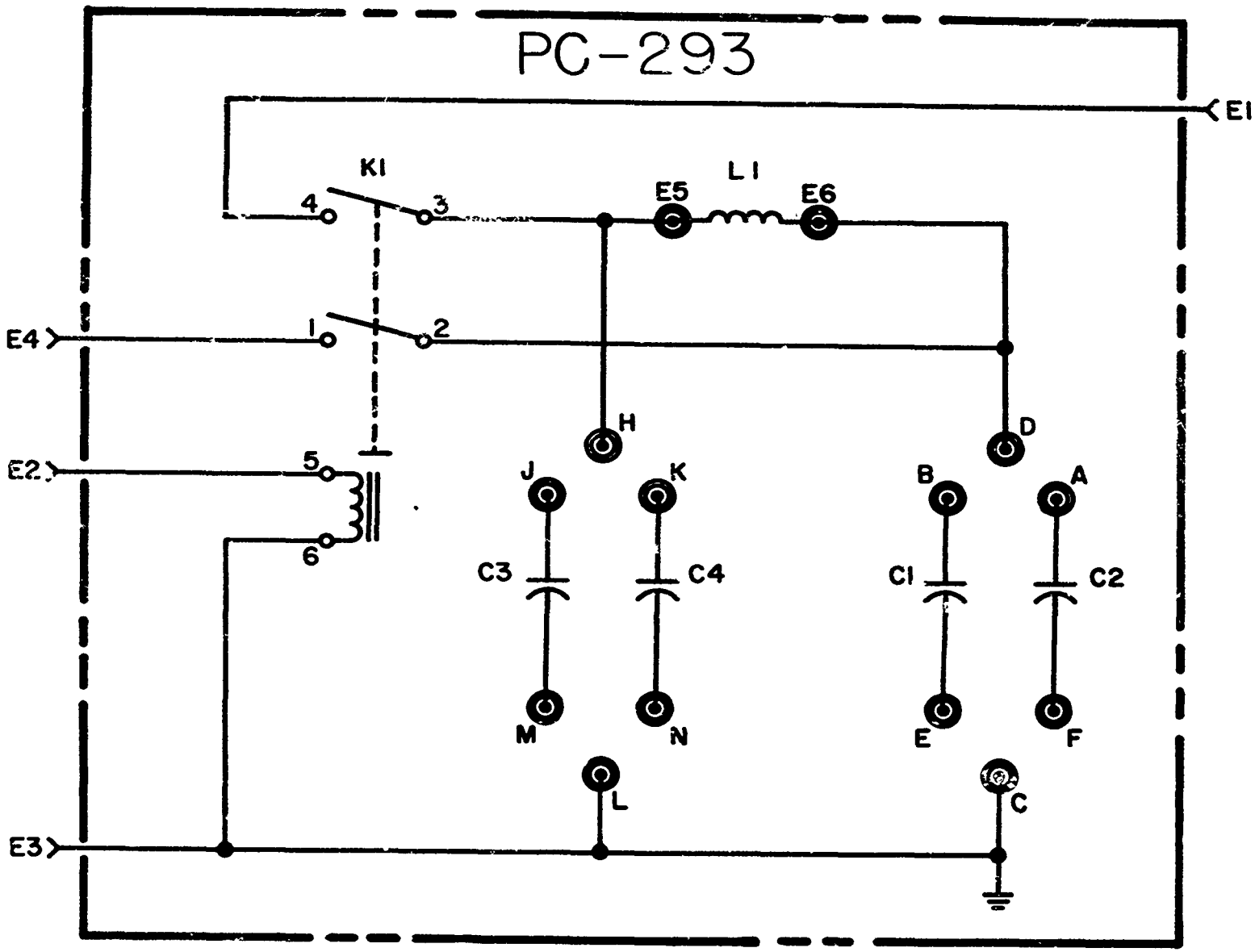

Fig. 6-22. PC 293 (P&B Dwg No. 10-13732) matching network type 5

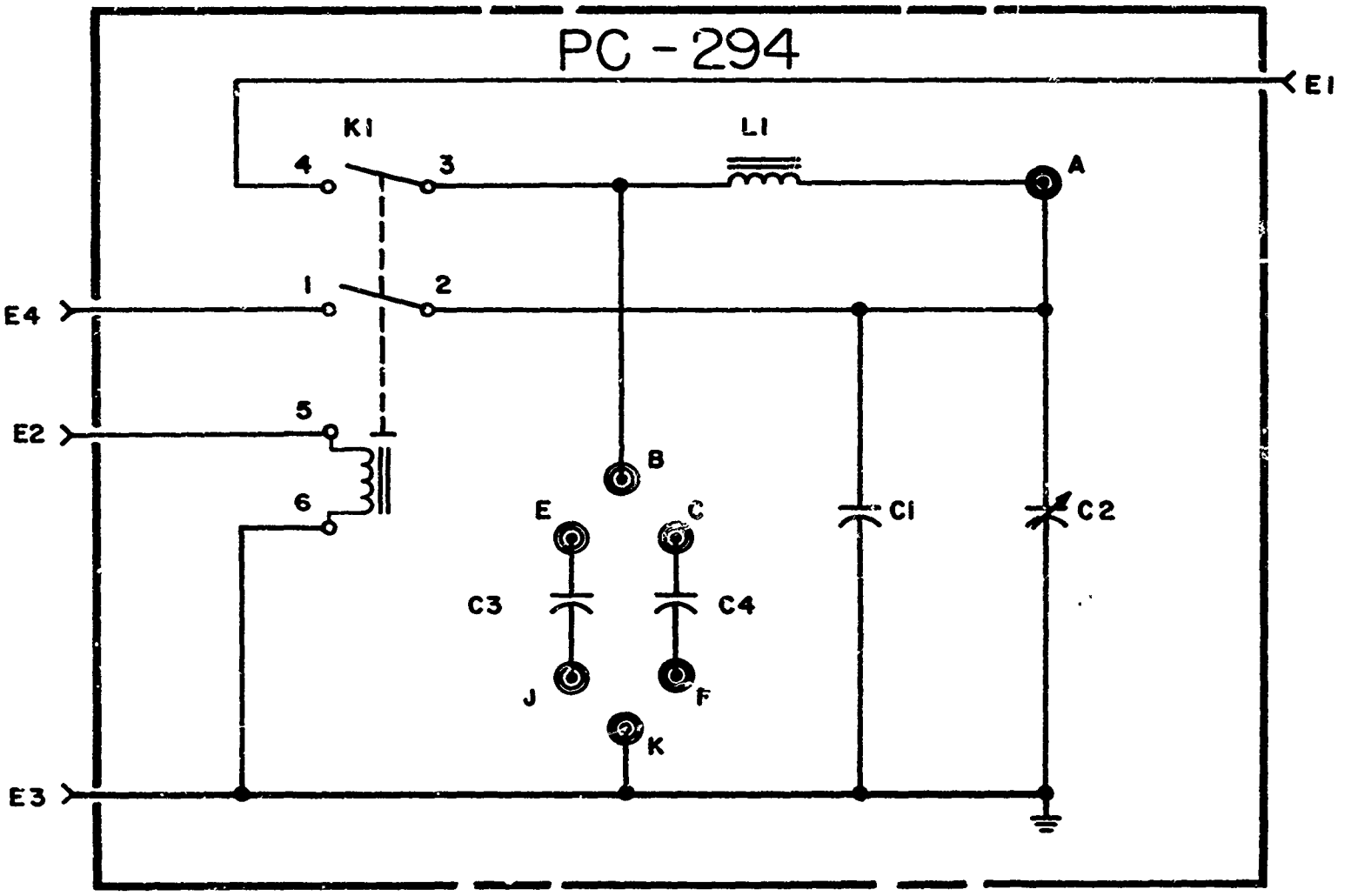

Fig. 6-23. PC 294 (P&B Dwg No. 10-13733) matching networks types 6 and 7

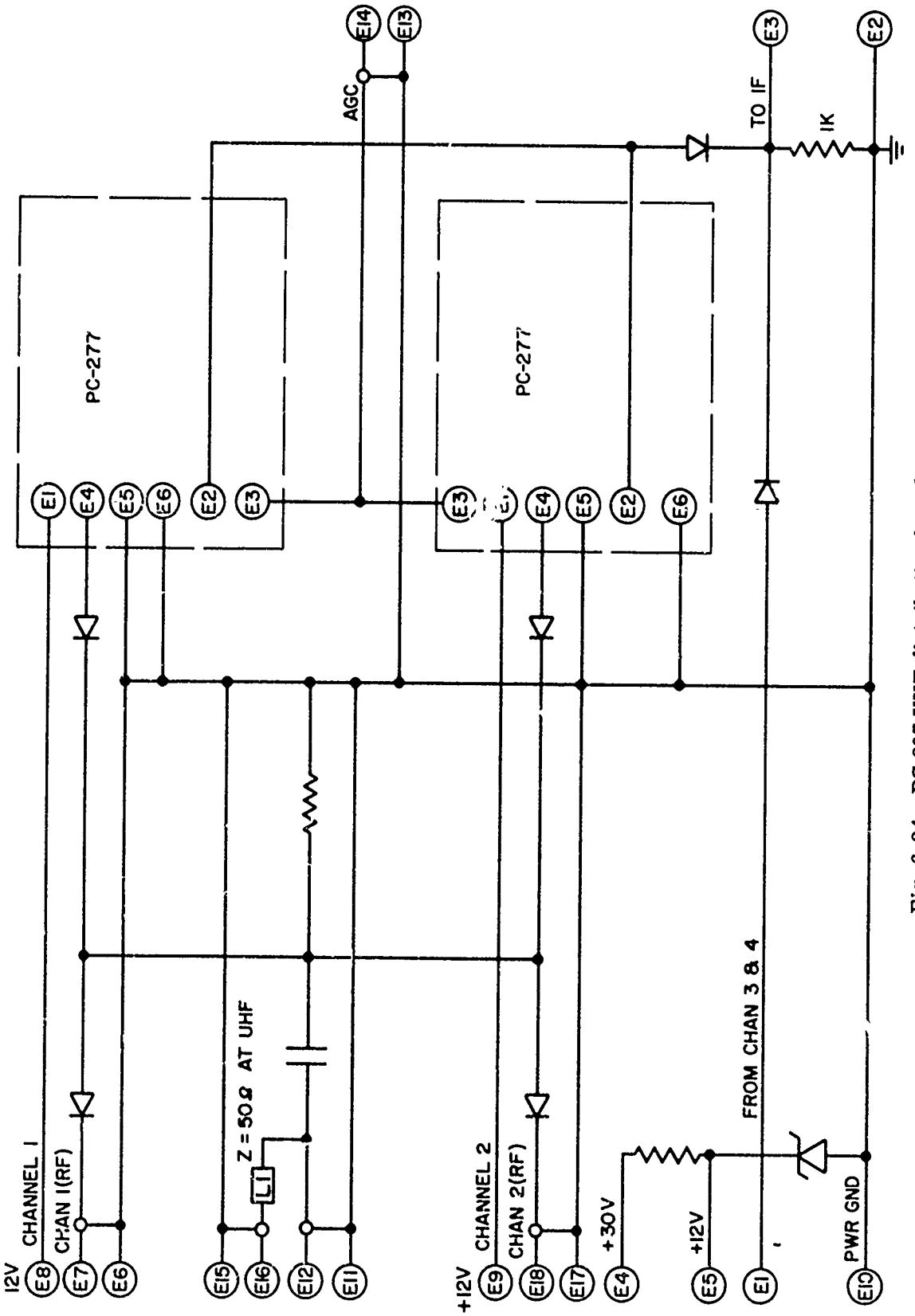

Fig. 6-24. PC 297 UHF distribution board type 1

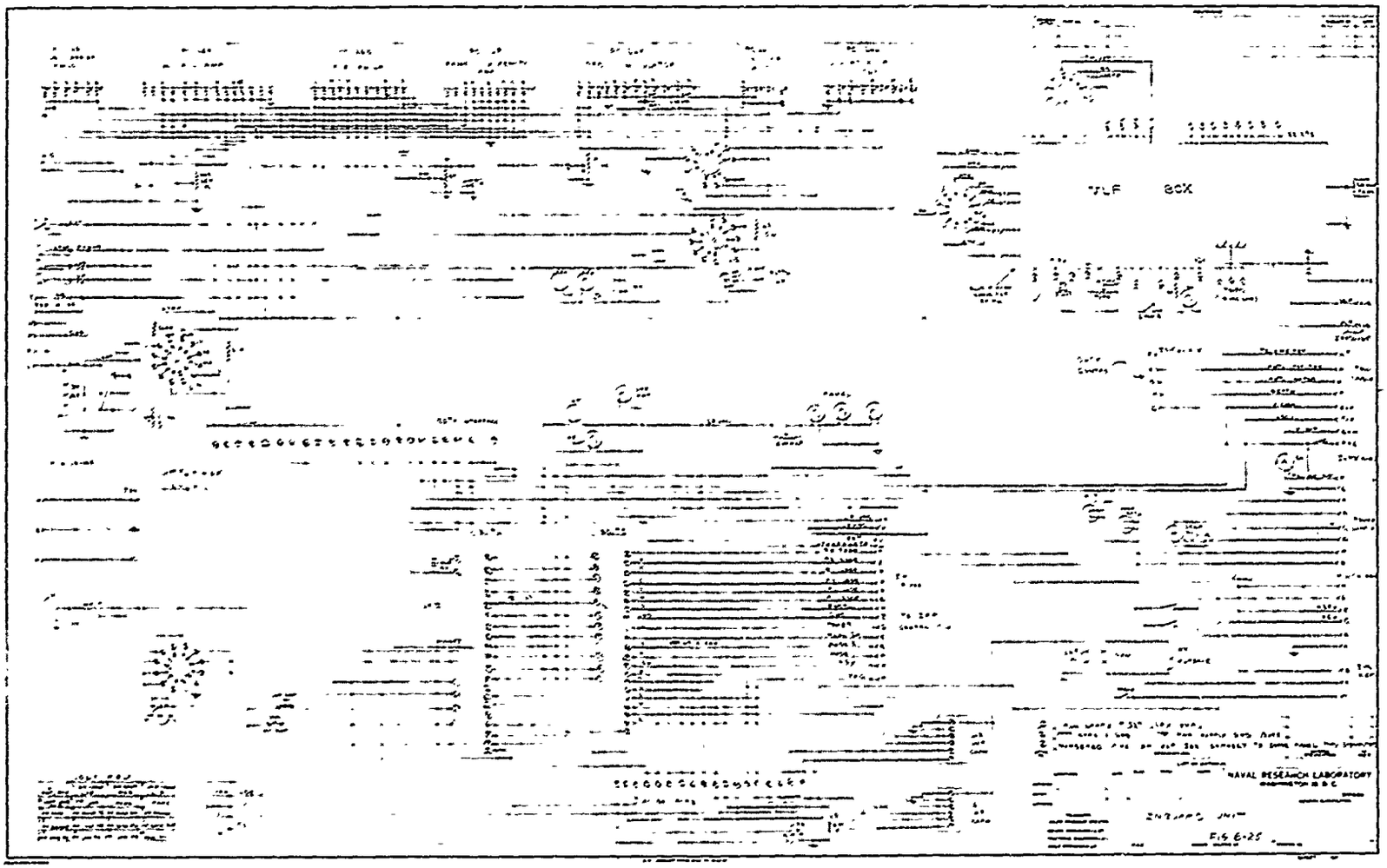

Fig. 6-25. Inboard unit

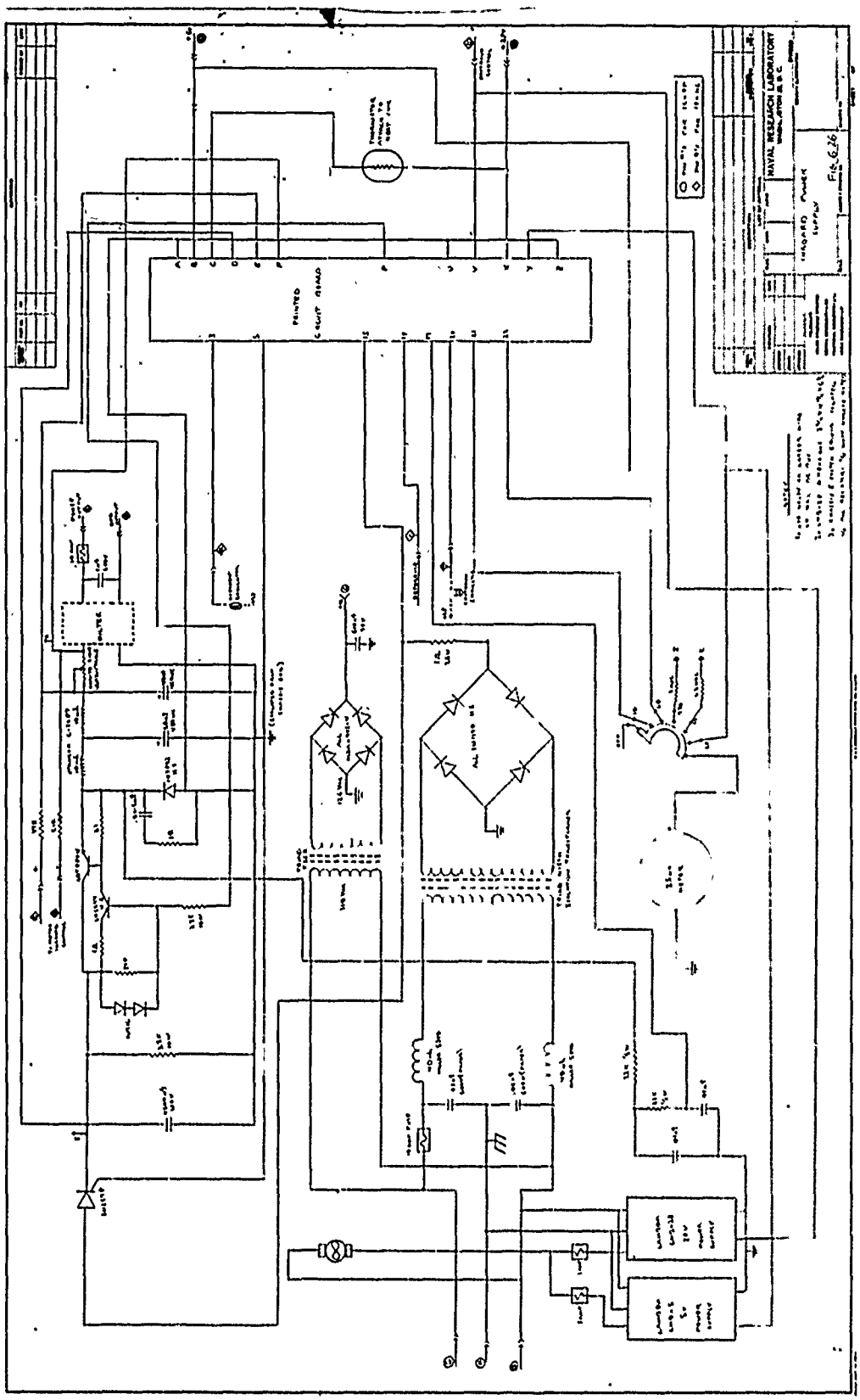

Fig. 6-26. Inboard power supply

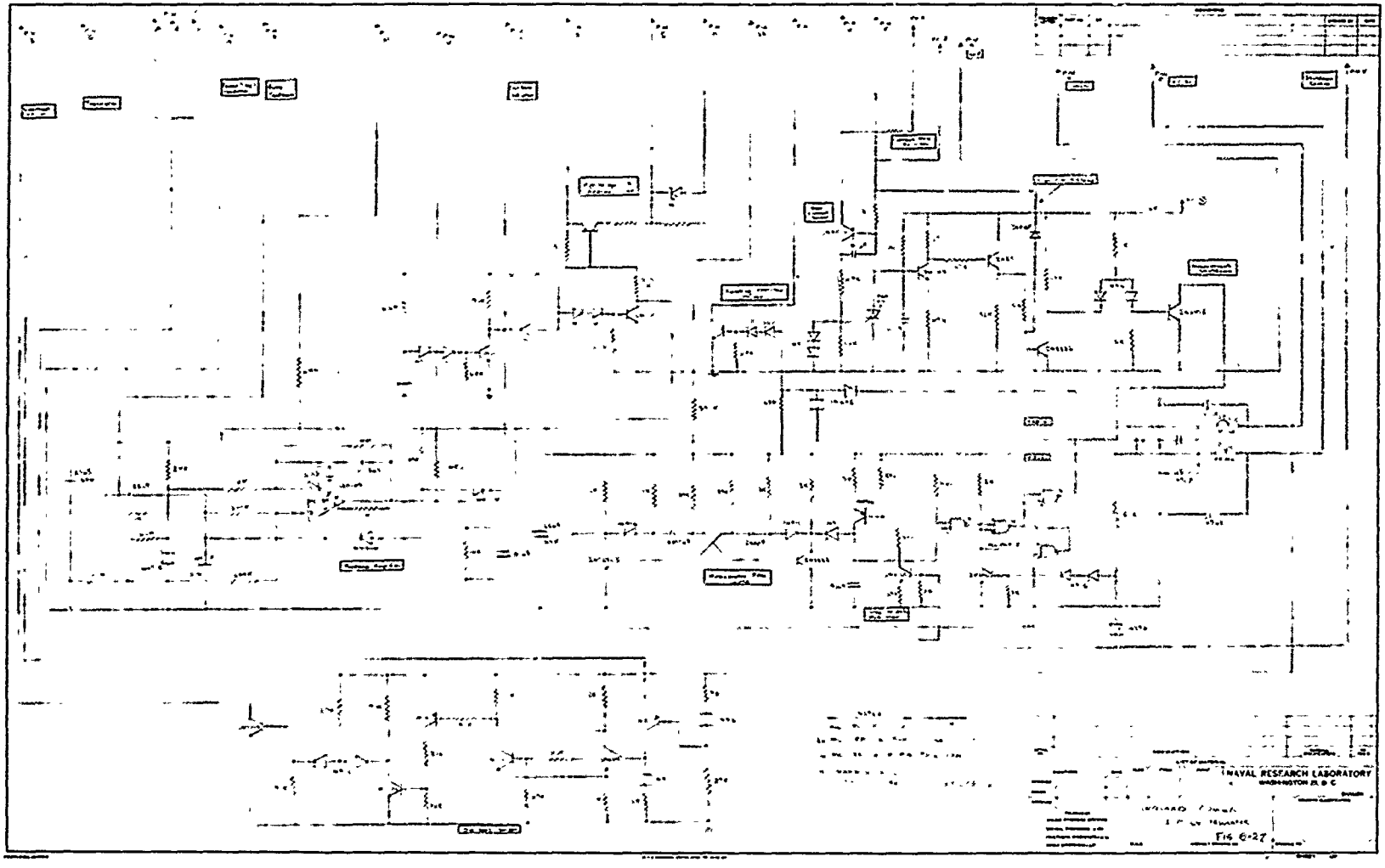

Fig. 6-27. Inboard power supply regulator

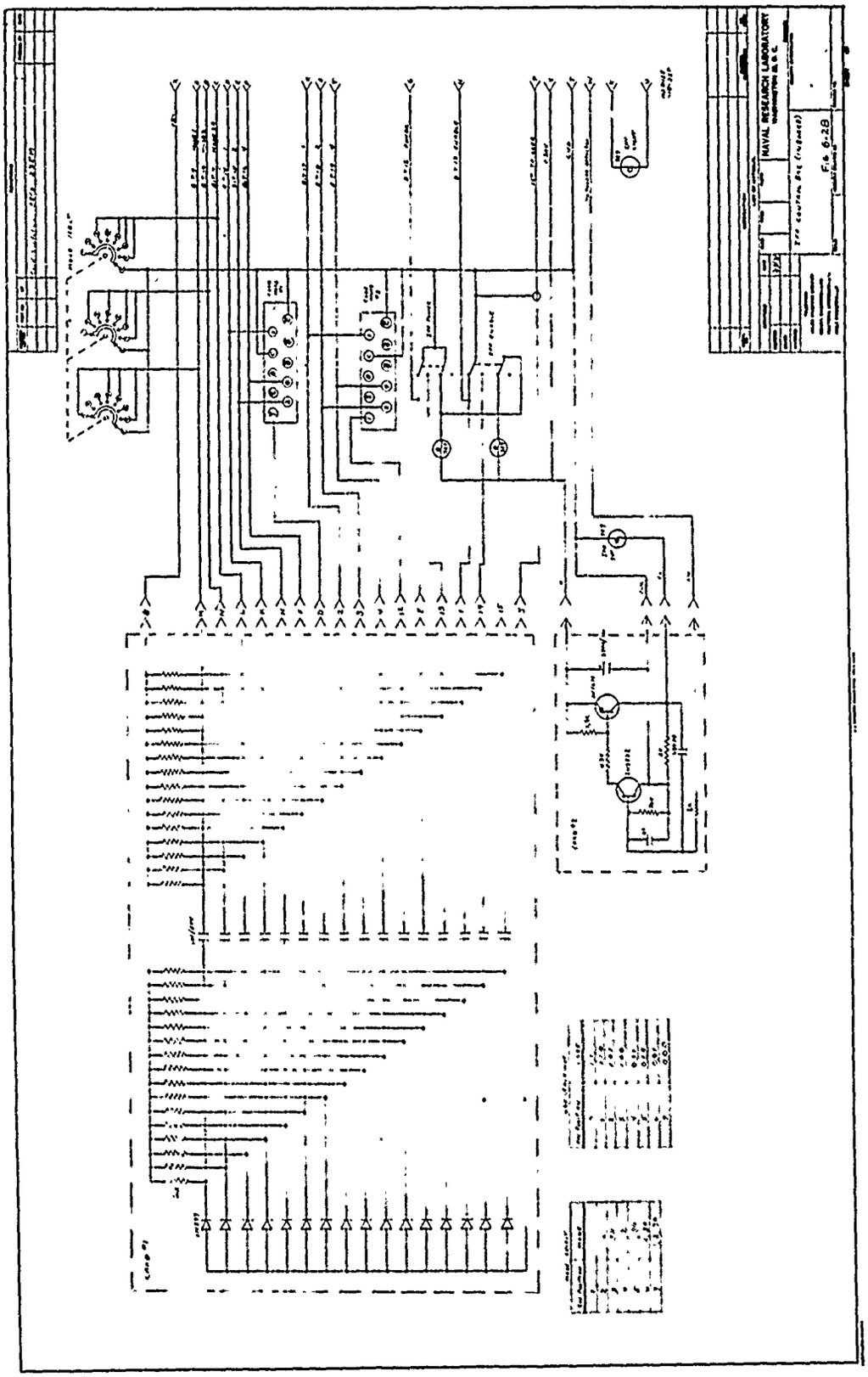

Fig. 6-28. IFF control box (inboard)

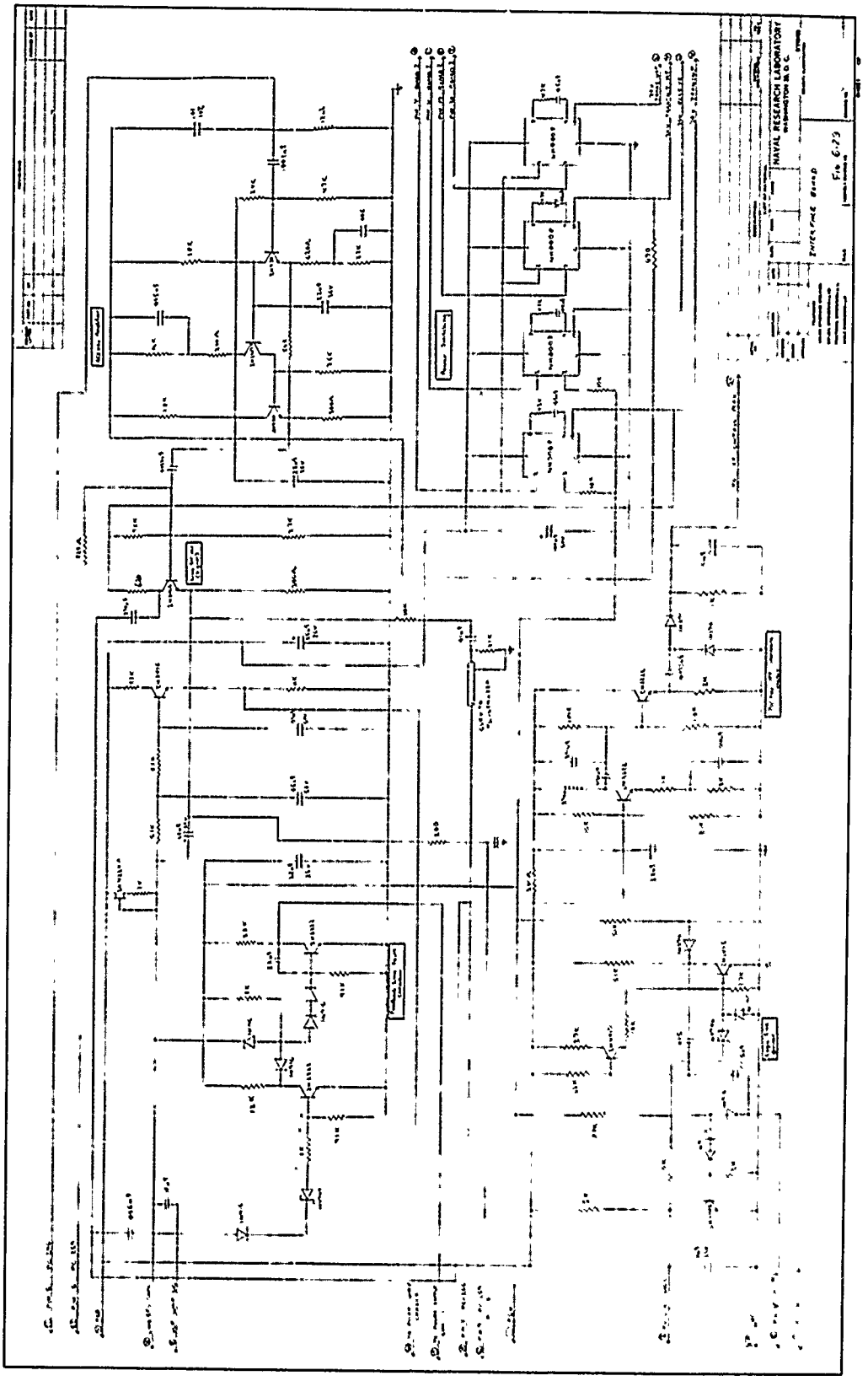

Fig. 6-29. Interface board

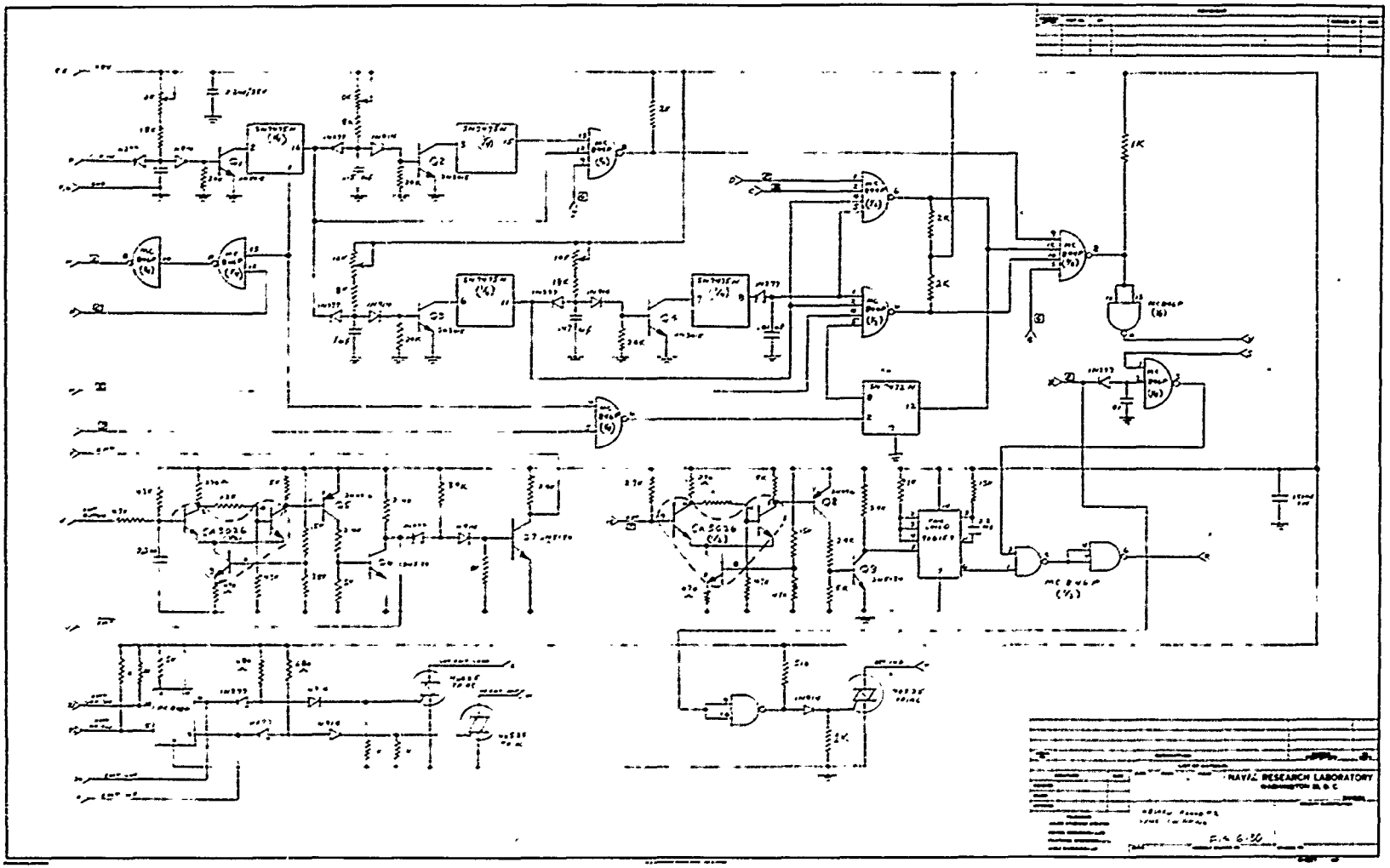

Fig. 6-30. Inboard board No. 2 (sync, switching)

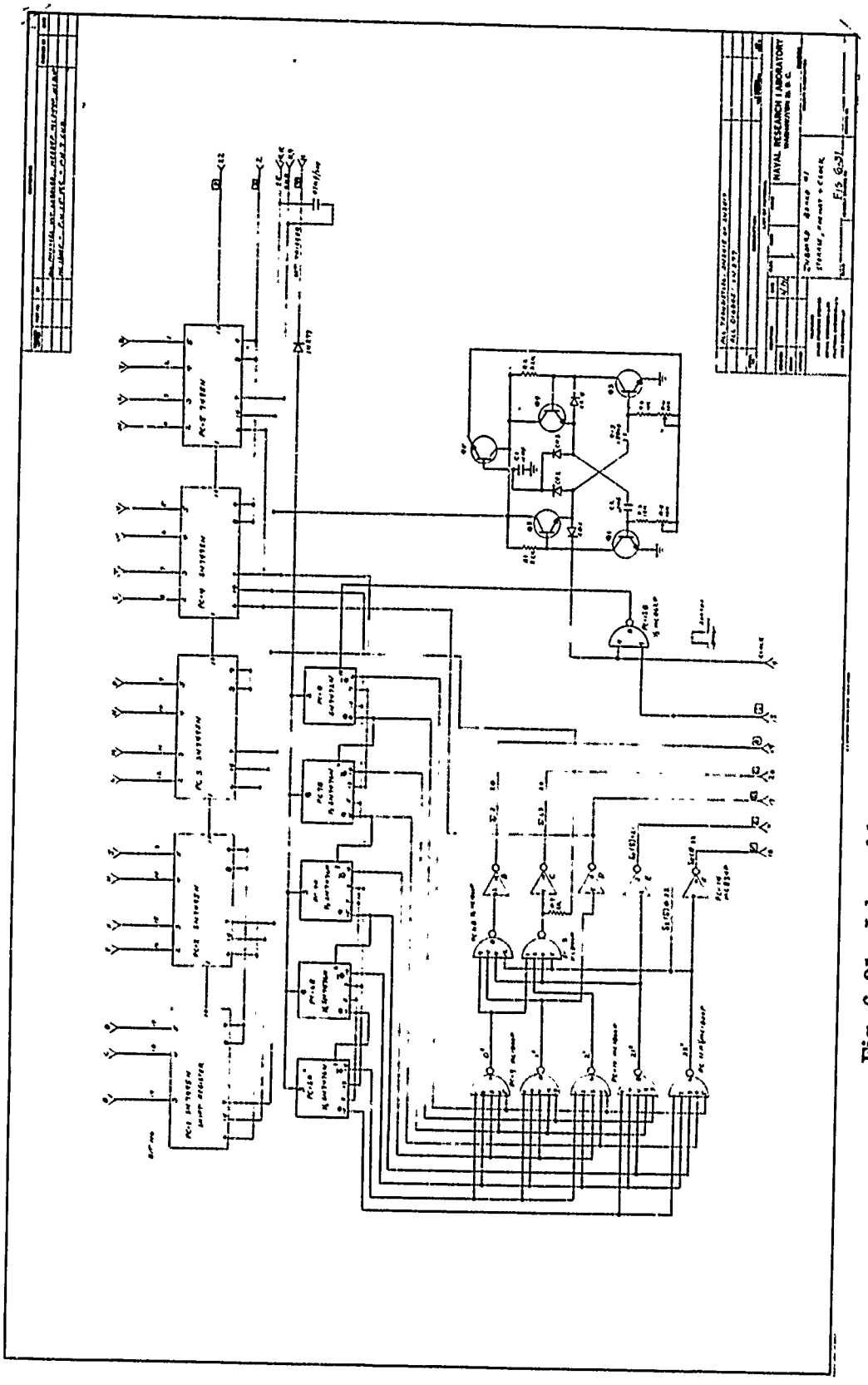

Fig. 6-31. Inboard board No. 1 (storage, format and clock)

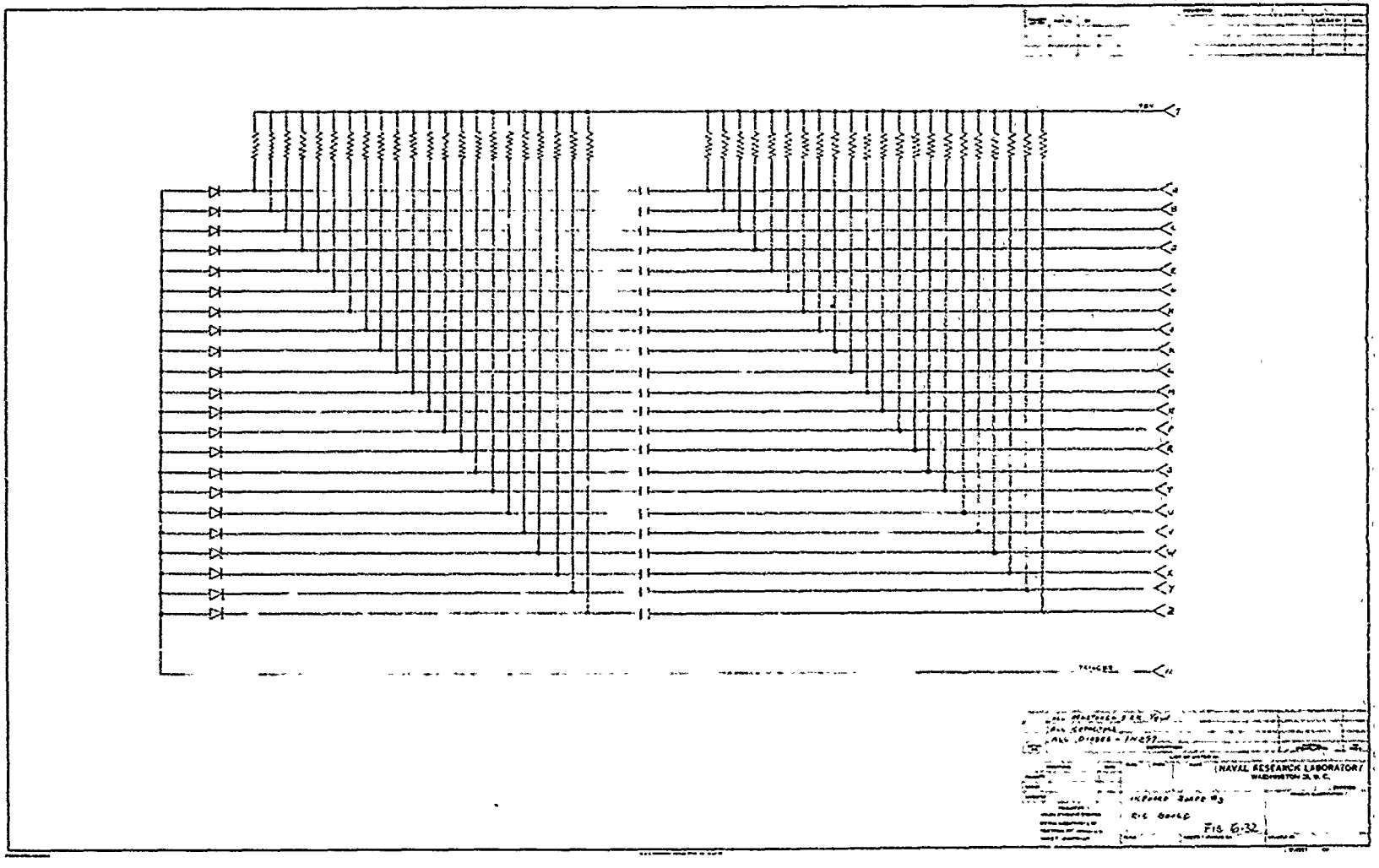

Fig. 6-32. Inboard board No. 3 (R-C board)

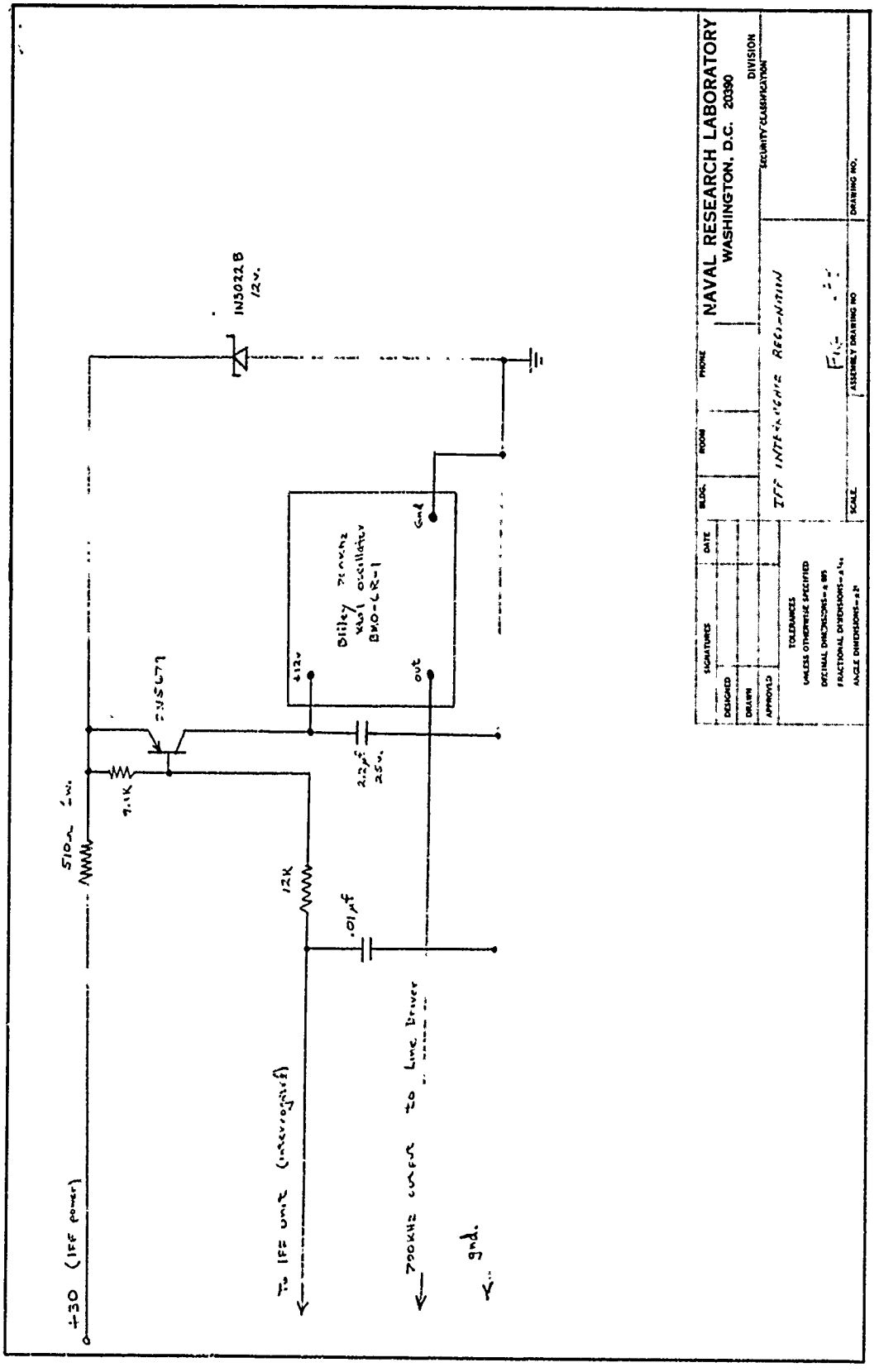

Fig. 6-33. IFF interrogate recognition

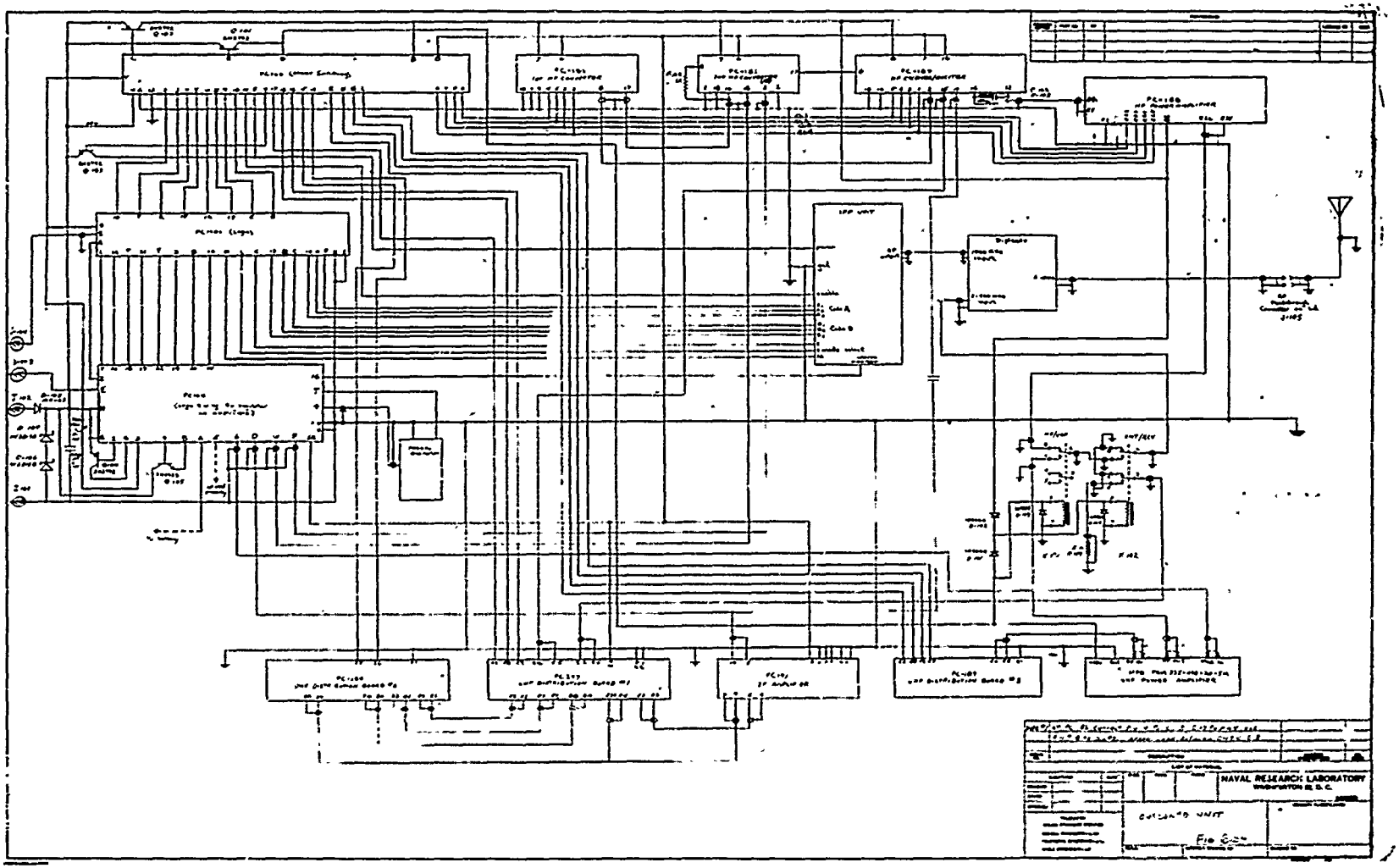

Fig. 6-34. Outboard unit

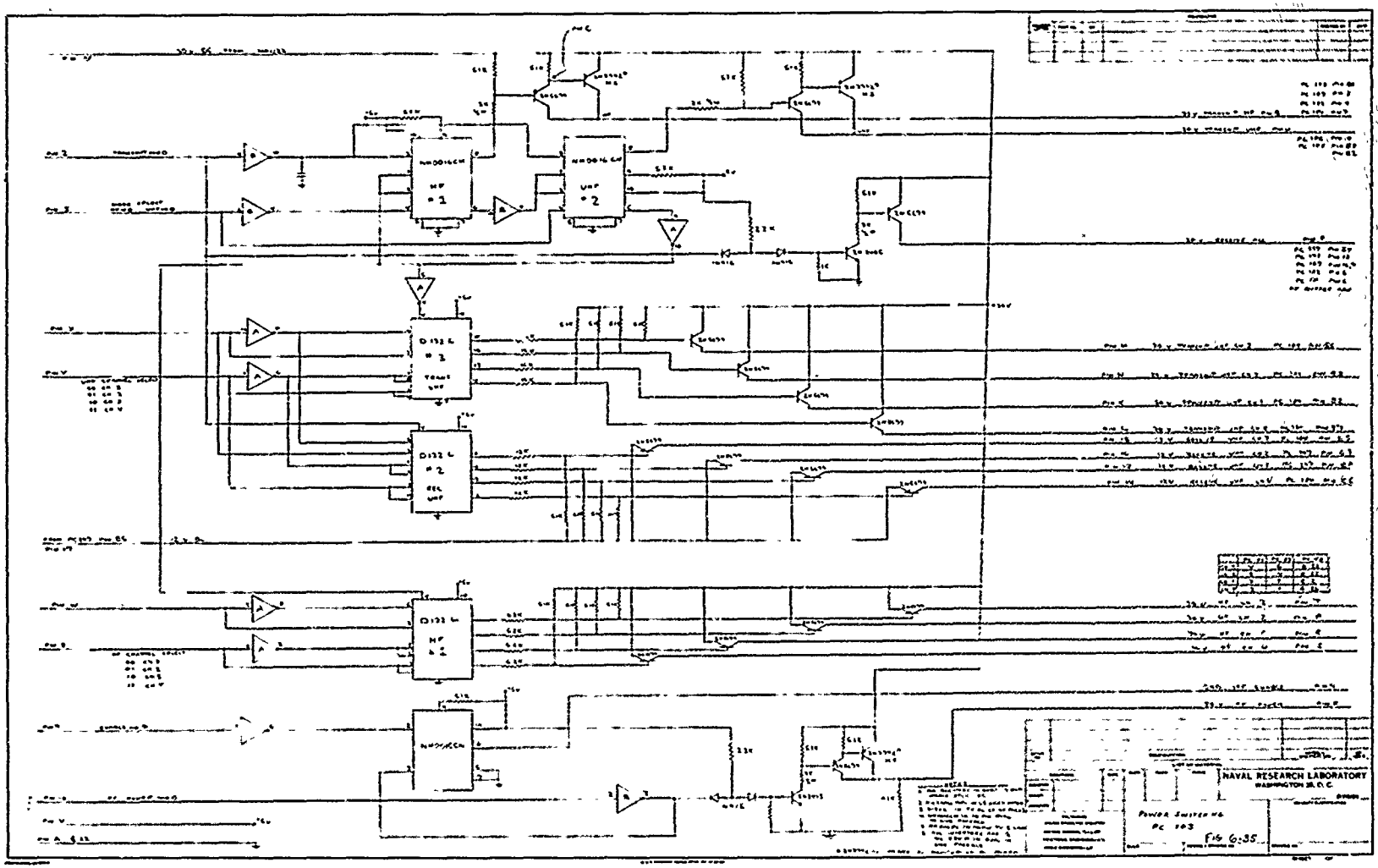

Fig. 6-35. Power switching PC 103

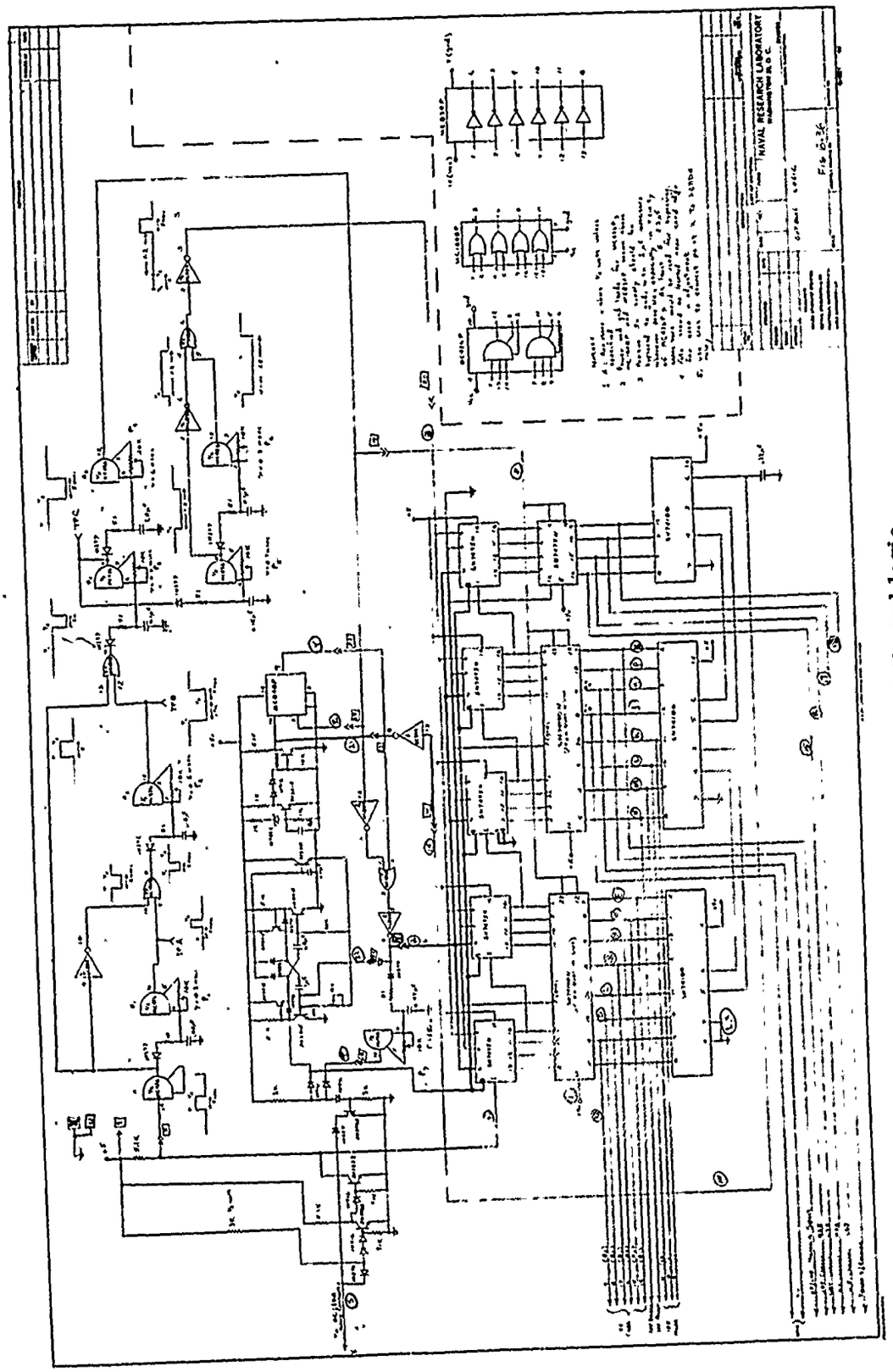

Fig. 6-36. Outboard logic

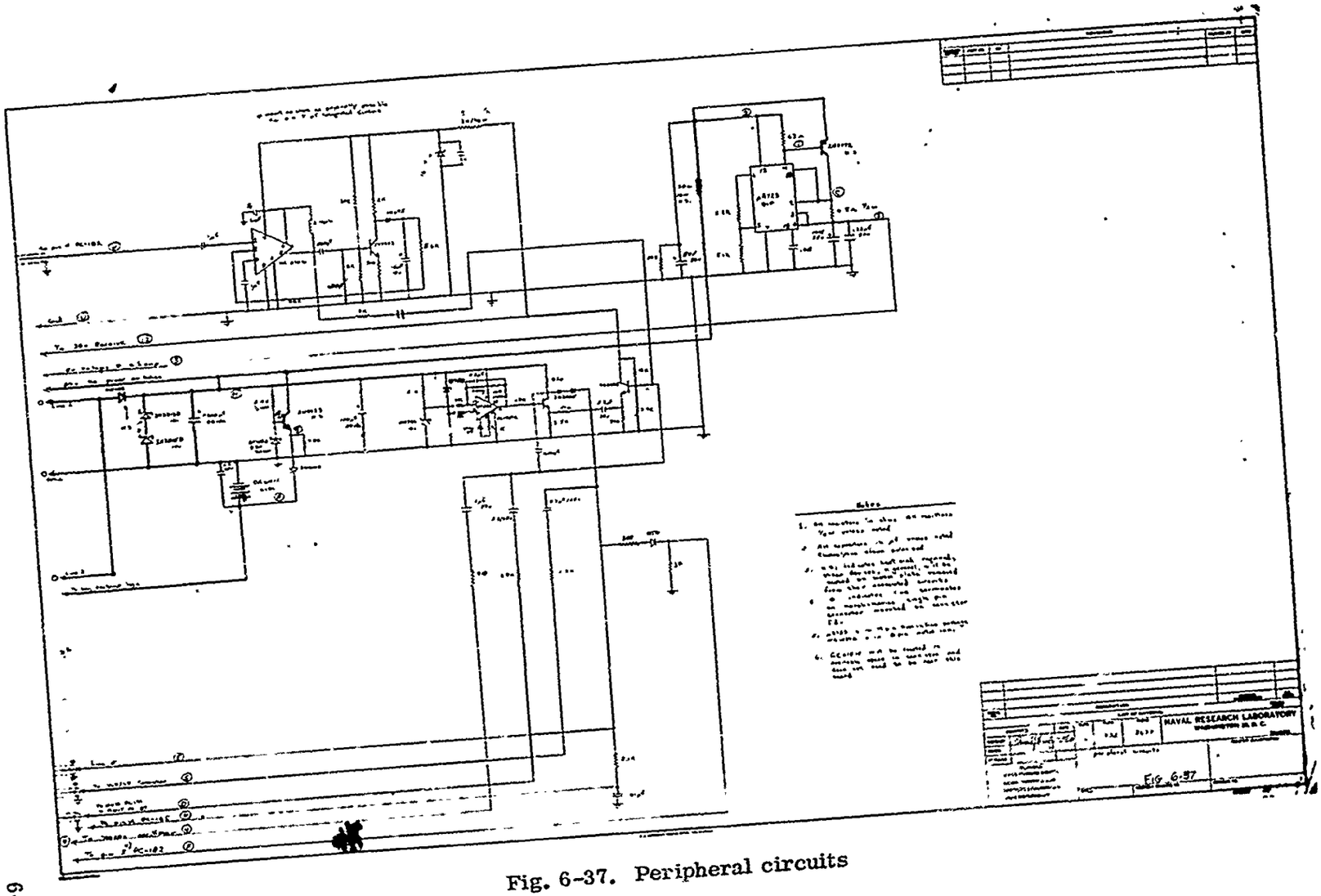

Fig. 6-37. Peripheral circuits

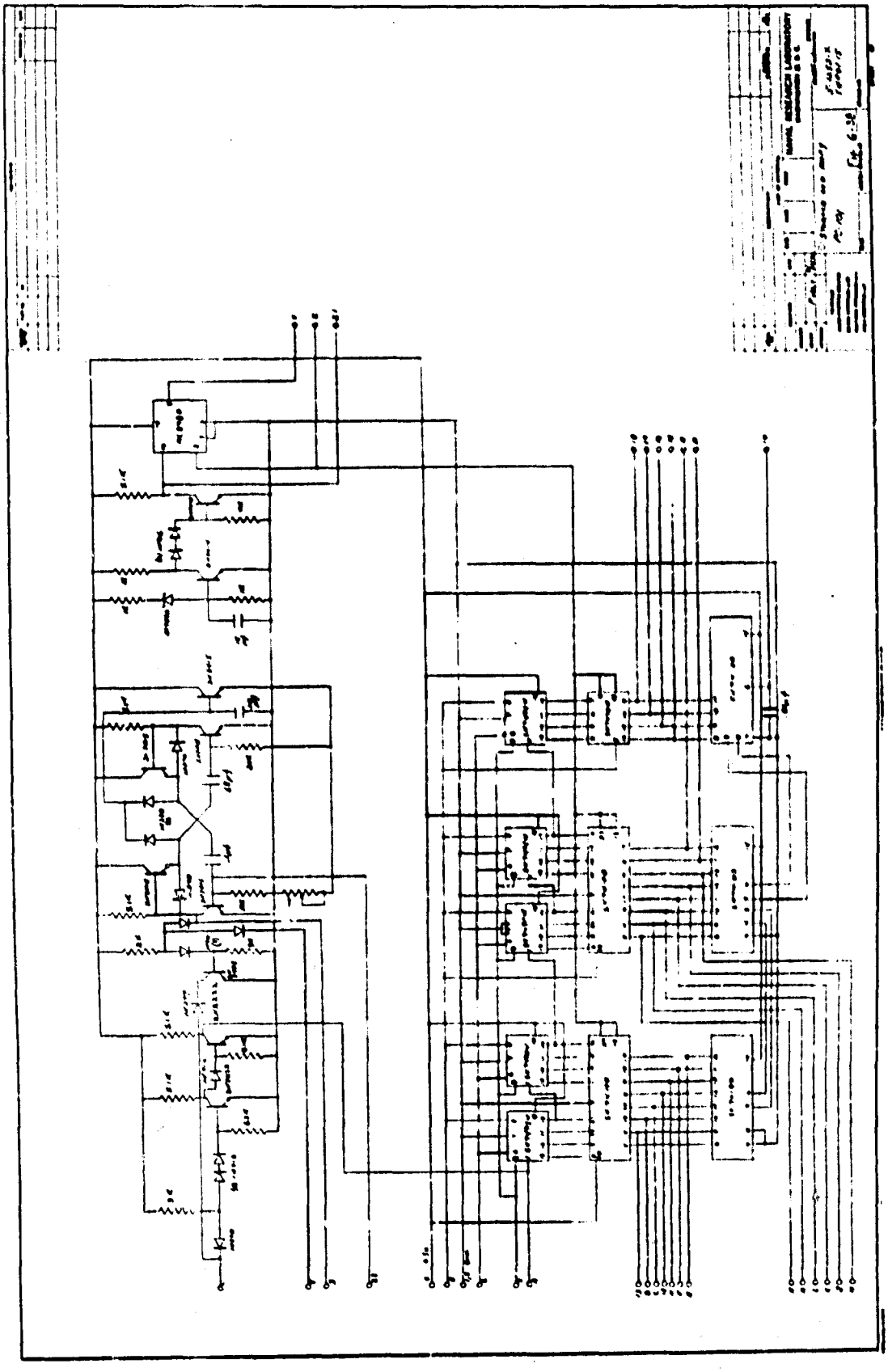

Fig. 6-38. Storage and parity PC-101